ORIGINAL ARTICLE

Ocular disorders in stroke patients in a tertiary hospital in Nigeria

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Abstract

Background: Stroke is a medical emergency of public health importance which affects the physical, mental, and emotional well-being of its victims. Management and rehabilitation are cumbersome for patients and caregivers. Ocular involvement and visual loss could further increase the burden of care.
Aim: To determine the prevalence of ocular disorders in patients with stroke in a Tertiary Hospital in Nigeria.
Materials and Methods: A descriptive hospital-based study was performed on all consenting and conscious adult patients aged 18 years and above with a diagnosis of stroke made within 1-year who were admitted to the stroke ward or attended the stroke clinic of the Neurology Unit in the Department of Medicine, University of Benin Teaching Hospital, Benin City from October 2013 to December 2013.
Results: A total of 170 eyes of 85 patients were studied with a mean age of 66.08 years ± 10.99; range 43–88 years. There was a male: female ratio of 2.6:1. Ocular abnormalities were documented in 95.5% of the patients. A presenting visual acuity of ≥6/18 was found in 66.7%. Mild ptosis and exotropia were seen in 2.9% and 0.6% of the eyes respectively. Intraocular pressure was between 10–21 mmHg in 87.7% eyes while 11.8% eyes had afferent pupillary defects. Cataract was seen in 71.8% eyes and optic nerve head changes in 48.8% eyes which includes temporal disc pallor and glaucomatous optic neuropathy in 29.4% and 14.2% eyes, respectively. Abnormalities found in the retina include retinal hemorrhages in 10.6% eyes, cotton wool spots in 2.4% eyes, and hard exudates in 7.8% eyes. Retinal vascular abnormalities were documented in 32.4% eyes. Visual complaints following stroke were documented in 9.6% of the patients.
Conclusion: Ocular abnormalities are present in patients with stroke, mostly due to predisposing risk factors for stroke, and age-related changes. Routine ophthalmic evaluation is suggested in the management of patients with cerebrovascular accident in our environment for better quality of care.

Key words: Cerebrovascular accident, ocular disorders, stroke

Introduction

Stroke or cerebrovascular accident (CVA) refers to a clinical syndrome of presumed vascular origin, characterized by rapidly developing focal or global disturbances of cerebral function, lasting more than 24 h, or leading to death.[1] Stroke is a medical emergency and can cause permanent neurological damage and death.[1] Risk factors include old age, high blood pressure, previous stroke or transient ischemic attack, diabetes mellitus (DM), and high cholesterol level; high blood pressure is the most

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modifiable factor.[2] Strokes are classified into two major categories: Ischemic and hemorrhagic. Ischemic strokes are those that are caused by interruption of the blood supply, while hemorrhagic strokes are the ones which result from rupture of a blood vessel or an abnormal vascular structure.[1] Stroke is the second leading cause of death worldwide and is a public health concern with European and world incidences of 171.1/100,000 and 107.9/100,000, respectively.[3,4] In Northern Africa, the incidence is 6.2/1000.[5] A study in Nigeria has shown an incidence rate of 54.08/100,000/year with a hospitalization rate of 84.6%.[6] Stroke is of great socioeconomic consequence in Nigeria as it commonly affects people between the ages of 41 and 70 years which form the bulk of the workforce.[7] Osuntokun reported that the frequency in hospital populations varied from 0.9% to 4.0% and stroke accounted for 0.5% to 45% of neurological admissions in Nigeria.[8] The main risk factors found were hypertension and DM for the adults, with a male: female ratio of 5:2, and incidence rates peaking in the eighth and seventh decades of life in males and in females, respectively. Danesi *et al*. in Lagos, Nigeria, reported a crude prevalence rate of stroke was 1.14/1000 (males 1.51; females 0.69).[9]

Ocular involvement in stroke could be seen when it affects areas of the brain that control eye functions, e.g. the brainstem and parts of the cerebral cortex responsible for vision.[1] On the other hand, risk factors and causes of stroke are known to directly affect the eyes. Identifying the ocular features and addressing them early could prove vital in preserving visual function, thereby preventing irreversible visual loss.

Materials and Methods

This study was a hospital-based descriptive study of patients with a diagnosis of CVA made by the consultants of the Neurology Unit of the University of Benin Teaching Hospital (UBTH), Benin City. Inclusion criteria were consenting patients who were conscious and aged 18 years and above being managed on the stroke ward or on an outpatient clinic. Exclusion criteria were unconscious stroke patients, patients with a history of ocular trauma or injury and patients with index stroke of >1-year duration as some features may have resolved over time. The study was performed from October 2013 to December 2013. Structured questionnaires specifically designed for the study were administered to all consecutive, eligible, and consenting patients. Informed consent was obtained from relatives for patients who were aphasic. The questionnaire was subdivided into three sections containing biodata, medical history and details, and ocular history and ocular examination. Relevant medical details were obtained from the case files of the patients. Patients with conditions requiring intervention such as glaucoma were referred to

the ophthalmic clinic for further management. Ethical clearance was obtained from the Ethics and Research Committee of the UBTH, Benin City. Data collected were analyzed with SPSS version 20 (SPSS Inc., Chicago IL) and a $P < 0.05$ was taken as statistically significant.

Results

A total of 86 stroke patients met the inclusion criteria. Eighty-five (98.8%) gave consent and participated in the study giving a response rate of 98.8%. There were 61 males (71.8%) and 24 females (28.2%) giving a male: female ratio of 2.6:1. The mean age of the patients was 66.1 ± 11.0 years (range 43–88 years). A majority of patients, 57 (67.1%) were ≥60 years [Table 1]. Ischemic stroke made up 67 (78.8%) of all the stroke cases, while hemorrhagic stroke made up the remaining 18 (21.2%) of cases. Hypertension, DM, and hyperlipidemia were present in 81 (95.3%), 31 (36.5%), and 7 (8.2%) patients, respectively. Features of diabetic retinopathy was present in 9 (29.0%) of the diabetics. The presence of any ocular abnormality was found in 81 (95.5%) patients. According to the World Health Organization on International Classification of Diseases[10], Table 2 shows that majority of the patients' eyes 115(67.6%) had normal vision with a presenting visual acuity of ≥6/18. Fourteen patients (16.5%) had severe visual impairment with visual acuity <3/60 in the better eye, and 11 patients (12.9%) had visual acuity less than 3/60 in one eye. The ocular changes found in the patients with CVA are presented in Table 3. Mild ptosis and exotropia were seen in 5 (2.9%) and 1 (0.6%) eyes, respectively. Most of the eyes, 149 (87.7%) had intraocular pressure within the normal range of 10–21 mmHg, 15 (8.8%) eyes had intraocular pressures of <10 mmHg, and 6 (3.5%) eyes had intraocular pressures of >21 mmHg. Afferent pupillary defect was found in 20 (11.8%) eyes. Lens opacities were seen in 122 (71.8%) eyes. Changes on the optic nerve head were documented in 83(48.8%) eyes which include temporal disc pallor and glaucomatous optic neuropathy in 50 (29.4%) and

Table 1: Demographic characteristics of the patients			
	Frequency (%)		Total (%)
	Male	Female	
Age in years			
0-40	0 (0.0)	0 (0.0)	0 (0.0)
41-60	24 (28.2)	9 (10.6)	33 (38.8)
>60	37 (43.5)	15 (17.7)	52 (61.2)
Total	61 (71.8)	24 (28.2)	85 (100.0)
Level of education			
None	2 (2.3)	5 (5.9)	7 (8.2)
Primary	14 (16.5)	9 (10.6)	23 (27.1)
Secondary	14 (16.5)	8 (9.4)	22 (25.9)
Tertiary	23 (27.1)	2 (2.3)	25 (29.4)
Postgraduate	8 (9.4)	0 (0.0)	8 (9.4)
Total	61 (71.8)	24 (28.2)	85 (100.0)

Table 2: Visual acuity of the patients

Presenting visual acuity	Patients' eyes (%)
≥6/18	115 (66.7)
<6/18-6/60	16 (9.5)
<6/60-3/60	25 (14.7)
<3/60-1/60 (CF at 1 M)	5 (2.9)
<1/60-light perception	4 (2.4)
No light perception	5 (2.9)
Total	170 (100.0)
Presenting visual acuity in better eye	Persons (%)
≥6/18	59 (69.4)
<6/18-6/60	9 (10.6)
<6/60-3/60	5 (5.9)
<3/60-1/60 (CF at 1 M)	7 (8.2)
<1/60-light perception	4 (4.7)
No light perception	1 (1.2)
Total	85 (100.0)

Table 3: Ocular findings in the patients

Parameters	Number of eyes* (n=170) (%)
Mild ptosis	5 (2.9)
Third cranial nerve palsy with exotropia	1 (0.6)
Pterygium	21 (12.4)
Arcus senilis	36 (21.2)
Keratic precipitates	2 (1.2)
Relative afferent pupillary defect	16 (9.4)
Total afferent pupillary defect	4 (2.4)
Cataract	122 (71.8)
Pseudophakia	3 (1.8)
Posterior vitreous detachment	6 (3.5)
Temporal disc pallor	50 (29.4)
Glaucomatous optic neuropathy	24 (14.2)
Primary optic atrophy	9 (5.3)
Focal arterial narrowing	4 (2.4)
Generalized arteriolar attenuation	42 (24.7)
Engorged and tortuous veins	51 (30.0)
Arterio-venous nipping	4 (2.4)
Retinal hemorrhages (dot/blot and flame shaped)	18 (10.6)
Hard exudates	13 (7.6)

24 (14.2%) eyes, respectively. Abnormalities found in the retina include retinal hemorrhages in 18 (10.6%) eyes, cotton wool spots in 4 (2.4%) eyes, and hard exudates in 13 (7.8%) eyes. Retinal vascular abnormalities were documented in 55 (32.4%) eyes. Nine patients (9.6%) had visual complaints following the index stroke. These were visual deterioration in 4 (4.7%) patients, difficulty in reading in 3 (3.5%) patients, flashes of light in 1 (1.1%) patient, and double vision in 1 (1.1%) patient.

Discussion

The mean age of patients in this study was 66.08 years. This is in agreement with previous studies from within and outside the country and not surprising as advancing age is a known risk factor for stroke.[1,2,7-9] A hospital-based study in South-Western Nigeria had a mean age of 68 years which is also in keeping with studies among blacks.[11] However, Caucasian populations tend to have higher mean age incidence of stroke above 75 years.[12,13] There was a male: female preponderance of 2.6:1 in this study. While some studies agree with a male preponderance,[7,8,14,15] others document a higher female predominance.[16-19] Reasons adduced to a higher female proportion include a higher life expectancy for females while studies with a higher male involvement attribute it to the cultural practice of placing more value on the male members of the family than their female counterparts and therefore more willingness to expend scarce resources on them in the form of hospital bills.[8,16,20] Males also being more economically independent in this part of the world and, therefore, may be more empowered to seek medical help. However, men are about 25% more likely to suffer from a stroke than women globally.[21] About one-third (36.5%) of the patients have attained a minimum tertiary level of education. A majority of the patients (63.5%) did not have tertiary education. A low educational status which frequently translates to poor knowledge and a low socioeconomic status have been found to be associated with a lower level of awareness of stroke.[22]

A presenting visual acuity of <6/18 was found in 55 (32.4%) eyes of which 5 (2.9%) eyes had no light perception. Thus almost one-third of the patients had a visual impairment in at least one eye. Although, not the best corrected visual acuity, as most of the patients were not refracted due to their clinical condition such as hemiplegia with difficulty in walking to the eye clinic of the hospital for refraction and aphasia with slurred speech, this shows that they function with suboptimal vision in their activities of daily living. The high prevalence of ocular abnormalities in 95.5% could be attributed to the fact that majority of the stroke victims were in the older adults with increasing incidence of conditions such as cataract, refractive errors, and age-related changes. The Nigerian National Blindness and Visual Impairment Survey has shown that uncorrected refractive errors is a major cause of visual impairment in Nigeria being responsible for 77.9% of mild visual impairment (<6/12–6/18), 57.1% of moderate visual impairment (<6/18–6/60), 11.3% of severe visual impairment (<6/60–3/60), and 1.4% of blindness (<3/60).[23,24] Lens opacities were the most common pathology noted in the study group in 71.8% eyes. This is most likely due to the higher proportion of the elderly population in the study as cataract is mostly an age related condition. It still remains the most common cause of avoidable blindness in Nigeria.[25] This should be tackled considering the fact that it is one of the most cost-effective interventions and will help improve the quality of life of these stroke victims.[26] Neuroophthalmic signs such as ptosis, strabismus, afferent pupillary defects, optic neuropathy, and abnormalities in the retina and its vasculature were present

in 2.9%, 0.6%, 11.8%, 48.8%, and 54.7% eyes, respectively. These may not be unrelated to the underlying vascular pathology evident in stroke patients as stroke is primarily a vascular disorder but with neurogenic consequences which ultimately also affect vision.[1] Age-related changes including drusen and pigmentary macular changes were found in 16.5% and 56.6% eyes, respectively. This again is likely not unrelated to the fact that majority of the patients in this study were in the elderly age group. However, these figures are lower than that reported by Abah *et al.*[27] and may probably be attributed to the fact that patients with acute stroke were those examined in that study while this report was on patients with a diagnosis of the stroke of up to 1- year duration.

It is recommended that ocular examination to be performed in the management of stroke patients in our environment to limit the disability that results from the condition. Indeed impaired vision with reduced mobility and cognitive ability in an individual who hitherto was active, independent, and economically stable can be quite depressing.

Limitations

These include the fact that patients with stroke of <24 h were not examined in this study largely due to the late presentation to tertiary health facilities which may have resulted in missing out on early and transient signs that may have resolved such as neurophthalmic manifestations. Ocular examinations such as gonioscopy and automated central visual field assessment were not performed due to the clinical state of most of the patients.

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Conflicts of interest
There are no conflicts of interest.

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