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Identify the Eye Health Outcomes of Stroke Patients in Iraq Through an Exploratory Study

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Abstract:

Introduction: In developed countries, stroke represents one of the most important determinants of hospital admission, permanent disability, and death. It is the main cause of disability, dependency, and loss of the capacity for social relationships in Western countries. Most strokes are of ischemic origin, and most ischemic strokes are due to atherothrombosis. Aim: This paper aims to identify the eye health outcomes of stroke patients in Iraq through an exploratory study. Patients and methods: This study was conducted by making an exploratory study of stroke patients, where this study focused on the Identify the eye health outcomes of stroke patients in Iraq. This study was applied to patients between the ages of younger than 30 to older than 65 years of age, for both sexes, male and female, in Baghdad-Iraq hospitals for a study that ranged from 17th of Jun 2021 to 24th March 2022. This study examined and analyzed all the data collected through the use of the program SPSS. The study data was divided into two groups: where the first group represented stroke patients, which included 40 patients, and the second group included non-stroke patients, which included 40 patients. Results and discussions: Stroke is considered one of the most severe factors affecting the visual vision of gold, which causes visual impairment, which allowed the stroke team to conduct an appropriate eye examination, where most of the injured patients were found to suffer from problems in eye movement and visual alignment or loss of visual field, as well as deformities in sight, and some of them did not suffer. The ‘suspicion' of visual difficulties was frequently used by personnel as a justification for a referral. Many forms of visual impairment, such as visual field loss, are invisible to an observer. Indicators of their presence, such as visual complaints, peculiar head motions used to compensate, neglecting one side, or shutting one eye due to double vision, should be looked for. We especially considered the type of sign and if this affected accuracy. Although many of these signs went unnoticed, identification of abnormal head posture, ptosis, strabismus, and nystagmus all had high accuracy, between (40%-78%) for the patients’ group and (70%-93%) for the

control group. Conclusions: In conclusion, this study showed that stroke has a big impact on the vision signs of patients were got higher percentages of diseases for patients. This study that, our results showed in the measure of visual accuracy for both groups, where it was found that the control group, who represent patients who have been cured of stroke, had better accuracy than the patients' group, and this results from the presence of a significant effect of stroke on the group of patients, especially in three factors Abnormal head posture, Pupil anomalies, and Facial weaknesses.

Key words: Stroke; vision sign; eye movement impairment; Strabismus; and Visual inattention.

Introduction

In developed countries, stroke represents one of the most important determinants of hospital admission, permanent disability, and death. It is the main cause of disability, dependency, and loss of the capacity for social relationships in Western countries. Most strokes are of ischemic origin, and most ischemic strokes are due to atherothrombosis [1-4]. In Spain, vascular disease (brain and heart) is the leading cause of morbidity and mortality in the population [5,6]. According to data from the National Institute of Statistics, it is the leading cause of death in women in Spain and the second cause of death behind ischemic heart disease; It is the leading cause of severe disability in adults and the second cause of dementia6. Stroke represents the second cause of mortality worldwide, according to the statistics of the World Health Organization [7-9].

In addition to the different neuro-ophthalmological clinical expressions of cerebrovascular disease, it is worth noting that retinal vessels share anatomical, physiological, and embryological characteristics with cerebral vessels. The retina is an extension of the diencephalon and has a blood-retinal barrier similar to the blood-brain barrier [10]. Changes in the retinal vessels probably reflect changes in the cerebral vessels. However, retinal irrigation is the only one that can be visualized live and directly without using invasive measures or means. The study of retinal vascular signs can give us very important clues to understand the pathophysiology of stroke and related cerebrovascular diseases [11].

The ophthalmic artery is in charge of irrigating the structures of the eye and the orbit. It is the first branch of the internal carotid artery; it goes forward to cross the optic foramen and enters the orbit along with the optic nerve. On very rare occasions, it can have its direct origin in the middle cerebral artery. It then follows the inferior border of the oblique major muscle to the internal angle of the orbit to give multiple collaterals (lacrimal, supraorbital, ethmoid, palpebral, central retinal artery) that form anastomoses with branches of the external carotid artery (internal maxillary, middle meningeal, and superficial temporal) to finally bifurcate into its two terminal branches, the internal frontal, and dorsal nasal arteries. It is an important anastomotic route between the internal and external carotid arteries, which is of great importance in carotid arterial occlusion in which the ophthalmic artery blood flow is retrograde or reversed from the external carotid artery to help irrigate the intracranial region.[10]

Together with the clinical syndromes of oculomotor and visual involvement of the vascular disease, carotid occlusive pathology can manifest itself at the ocular level in multiple ways. Transient monocular blindness, central retinal artery occlusions, branch retinal artery occlusions, retinal artery embolisms, ocular ischemic syndromes, and ischemic optic neuropathies, among others, are a sample of them. Atherosclerotic disease of the internal carotid artery can produce a wide variety of ipsilateral ocular clinical symptoms and signs that are very important to be aware of as they herald devastating stroke or the possibility of future coronary risk. Stasis venous retinopathy

and ocular ischemic syndrome are also associated with severe ocular hypoperfusion, an outward manifestation of carotid occlusive disease. [11]

The study of retinal microcirculation constitutes a very interesting opportunity for the assessment of vascular risk [11-15]. Recent population studies have emphasized the relationship between vascular changes in the retina and the risk of suffering a stroke [13]. Its presence carries a two to three times greater risk of suffering a stroke at age 3. The observation through frames of arteriovenous crossings, segmental or diffuse arteriolar narrowing, microaneurysms, exudates, and retinal hemorrhages is related to the incidence of stroke and mortality from cerebrovascular disease, in the same way as with the appearance of cognitive impairment and changes in substance. Whiteness and cerebral atrophy in MRI studies, regardless of the presence of diabetes, arterial hypertension, or other vascular risk factors [16-17], constituting, for most authors, a marker of cerebral microangiopathy.

Retinal emboli are small plaques lodged in the lumen of retinal arterioles, composed of cholesterol fragments, fibrin platelet aggregates, or calcified valve particles. They can be cholesterol emboli, yellow, shiny, or fibrin platelet emboli that are fleeting, greyish-white, and adapt to the vascular profile because they are soft and disintegrable. Classically, calcium emboli are described as white and with irregular edges. They originate from ulcers of carotid plaques or the aortic arch, carotid mural thrombi, or valvular calcium material. They are infrequent in the general population, with a population prevalence of 0.2 to 1.4% of adults older than 40 years, and rarely bilateral. Its presence is associated with increased mortality from stroke, almost three times more in 5 years [10]. Cardiac catheterization can cause retinal embolism and be a marker of cerebrovascular embolism. In a recent prospective study, its frequency was estimated at 2% without any visual or neurological clinical manifestation [17]. Much less prevalent are Roth spots, which are not pathognomonic of bacterial endocarditis. A path is opened for the standardized development of the technique and for elucidating the role of venules in cerebrovascular disease [15].

Transient ischemic attack (TIA) is a focal neurological dysfunction of vascular origin with a defined temporal profile and etiopathogenic characteristics similar to a stroke. The accepted duration of 24 hours was chosen arbitrarily [18], so currently, a working group made up of experts (TIA Working Group) has proposed a new definition. These authors propose, based on recent clinical data and better pathophysiological knowledge of cerebral ischemia, that TIA is a brief episode of focal dysfunction caused by cerebral or retinal ischemia in which symptoms usually last less than one hour and there should be no evidence of cerebral infarction [19]. With this redefinition, they consider that the main objectives that should guide the care of patients with acute cerebrovascular disease are met. Thus, more value is given to the biological fact of objectifying an ischemic brain lesion, and therefore, an urgent imaging examination must be carried out to analyze this possibility. Although an overlap of symptoms between the anterior and posterior circulation is recognized (only amaurosis fugax is exclusive to the carotid system), these TIA subtypes are distinguished according to clinical manifestations: retinal, cortical hemispheric, subcortical or lacunar, and atypical. There is recognized evidence from numerous community and hospital studies that TIA is a clinical predictor of serious vascular events (stroke, ischemic heart disease, death from vascular causes, and hospitalization for vascular disease). For this reason, care for patients presenting with a TIA is one of the most important interventions in secondary prevention [20].

Amaurosis fugax (AF) refers to a phenomenon of transient monocular visual loss, generally lasting less than 10 minutes, caused by an alteration of the retinal circulation in most cases due to emboli from the ipsilateral carotid artery or the heart, the latter less frequently [18]. Occasionally, emboli can be observed in the ophthalmoscopic study. Transient unilateral loss of vision from exposure to bright light has been described as a manifestation of critical ipsilateral carotid stenosis or

internal carotid artery occlusion, attributed to the inability of retinal metabolism to respond to light stimulation as a consequence. Of a critical decrease in blood flow at the level of the ipsilateral carotid system. Light consumes the photoreceptor pigment, which must be resynthesized by an energy-dependent process, and this ability may be compromised by retinal ischemia. During exposure to intense light, there is a 22% increase in focal blood flow in the explored eye with respect to the contralateral or basal eye. AF on one side can be combined in the same episode, or successively, with a motor or sensory disorder of the contralateral hemi body or with a language disorder; it is the so-called optical-cerebral syndrome [21]. This paper aims to identify the eye health outcomes of stroke patients in Iraq through an exploratory study.

Patients and methods

This study was conducted by making an exploratory study of stroke patients, where this study focused on the Identify the eye health outcomes of stroke patients in Iraq. This study was applied to patients between the ages of younger than 30 to older than 65 years of age, for both sexes, male and female, in Baghdad-Iraq hospitals for a study that ranged from 17th of Jun 2021 to 24th March 2022. This study examined and analyzed all the data collected through the use of the program SPSS. The study data was divided into two groups: where the first group represented stroke patients, which included 40 patients, and the second group included non-stroke patients, which included 40 patients.

This data was expanded with the distribution of age to patients in between two groups where the first group represented stroke patients and the second group included non-stroke patients, which have divides into (35-65) years where all details can be seen in **Table 1**. In another side, this study was distributed to the patients in **Table 2**. This paper found visual signs outcomes for patients where to include Nill, suspicion, eye movement, facial weakness, Petousis, strabismus, nystagmus, and pupil anomaly.

All these information assessments can be seen in **Table 3**. To progress the assessment of outcomes, this study was assessed the eye accuracy where have Nill, visual field loss, blurred vision, diplopia, visual hallucinations, oscillopsia, visual inattention, and eye movement impairment for stroke patients in **Table 4** and non-stroke patients in **Table 5**. In the evaluation of the accuracy of sign recognition patients, where Ptosis, Strabismus, Nystagmus, Abnormal eye movements, Visual inattention, and Facial weakness where, details can be found in **Figure 1**. This study was showed where assess Hypertension and Aneurysm, and these outcomes can be clarified in **Table 7**.

Results

Table 1: Distribution of patients according to Age

Statistics			
		Age-patients	**Age-control**
N	Valid	40	40
	Missing	6	6
Mean		40.5250	38.9250
Median		38.0000	40.0000
Mode		34.00	46.00
Std. Deviation		12.58201	12.73072
Minimum		24.00	22.00
Maximum		60.00	56.00

Table 2: Distribution of patients according to sex

(A)

Patients

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	14	35.0	35.0	35.0
	male	26	65.0	65.0	100.0
	Total	40	100.0	100.0	

(B)

Control

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	21	52.5	52.5	52.5
	male	19	47.5	47.5	100.0
	Total	40	100.0	100.0	

Table 3: Assessment of visual signs for patients' group and control group

(A)

Patients

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**blurred vision**	3	7.5	7.5	7.5
	diplopia	5	12.5	12.5	20.0
	eye movement impairment	9	22.5	22.5	42.5
	Nill	4	10.0	10.0	52.5
	oscillopsia	4	10.0	10.0	62.5
	visual field loss	4	10.0	10.0	72.5
	visual hallucinations	7	17.5	17.5	90.0
	visual inattention	4	10.0	10.0	100.0
	Total	40	100.0	100.0	

(B)

Control

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**blurred vision**	5	12.5	12.5	12.5
	diplopia	1	2.5	2.5	15.0
	eye movement impairment	4	10.0	10.0	25.0
	Nill	15	37.5	37.5	62.5

	oscillopsia	3	7.5	7.5	70.0
	visual field loss	5	12.5	12.5	82.5
	visual hallucinations	4	10.0	10.0	92.5
	visual inattention	3	7.5	7.5	100.0
	Total	40	100.0	100.0	

Table 4: Vision assessment of after stroke for patients

Patients					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Abnormal	5	12.5	12.5	12.5
	eye movements	7	17.5	17.5	30.0
	Facial weakness	5	12.5	12.5	42.5
	Nystagmus	6	15.0	15.0	57.5
	Ptosis	7	17.5	17.5	75.0
	Strabismus	5	12.5	12.5	87.5
	Visual inattention	5	12.5	12.5	100.0
	Total	40	100.0	100.0	

Table 5: Vision assessment of the control group after the stroke

Control group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Abnormal	4	10.0	10.0	10.0
	eye movements	6	15.0	15.0	25.0
	Facial weakness	5	12.5	12.5	37.5
	Nystagmus	4	10.0	10.0	47.5
	Ptosis	7	17.5	17.5	65.0
	Strabismus	3	7.5	7.5	72.5
	Visual inattention	11	27.5	27.5	100.0
	Total	40	100.0	100.0	

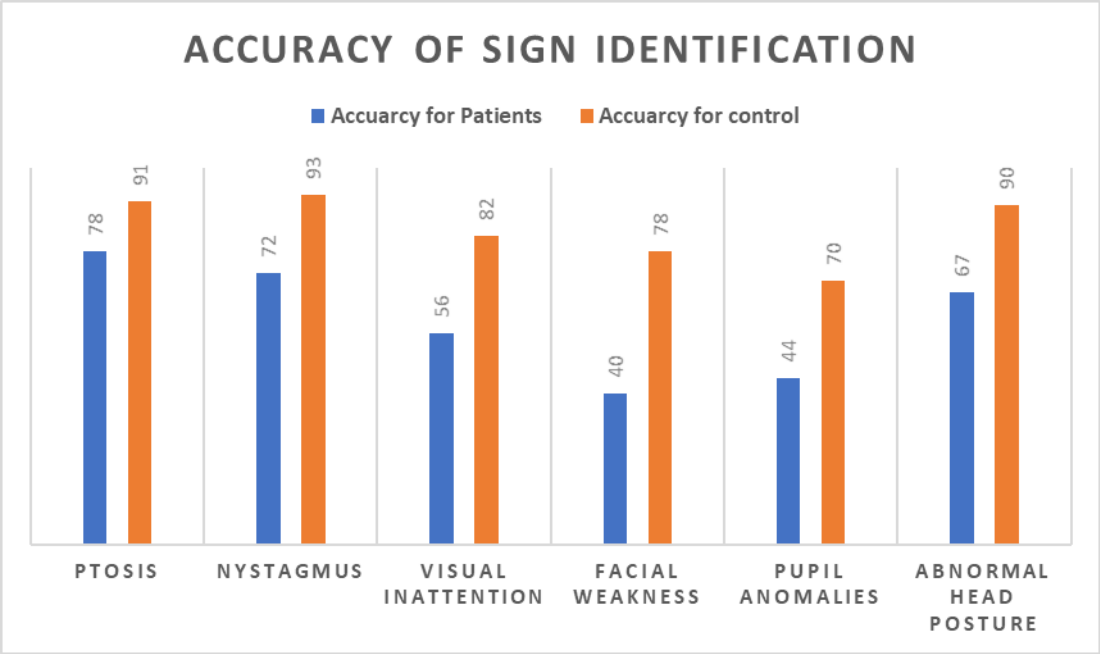

Figure 1: Identify of sign accuracy in between the patients' group and control group.

Table 6: Evaluation of patients' and control groups' signs after stroke.

Variables	**C**	**Advantages**	**Patients group**	**Controls Group**
Hypertension	R SIG	1 1	+ 0.913 0.0022	- 0.221 0.98
Aneurysm	R SIG	1 1	0.38* 0.0051	- 0.19 0.82

Discussion

Stroke is considered one of the most severe factors affecting the visual vision of gold, which causes visual impairment, which allowed the stroke team to conduct an appropriate eye examination, where most of the injured patients were found to suffer from problems in eye movement and visual alignment or loss of visual field, as well as deformities in sight. Some of them did not suffer [22]. In this study, which was carried out in hospitals in Baghdad, it was shown that most of the patients with stroke in the group of patients had visual problems, while the eye patients who had recovered from stroke were mostly normal and did not suffer, and some of the others were normal in visual signs. [23,24]

When comparing the data provided on the referral form to what the multidisciplinary team observed and thus helped to their evidence for referral, just over half of employees stated that eye signs were evident, despite the finding that referrals of alleged visual difficulty had a high positive predictive value. The 'suspicion' of visual difficulties was frequently used by personnel as a justification for a referral. Many forms of visual impairment, such as visual field loss, are invisible to an observer. Indicators of their presence, such as visual complaints, peculiar head motions used to compensate, neglecting one side, or shutting one eye due to double vision, should be looked for. [25,26]

Our results showed in the measure of visual accuracy for both groups, where it was found that the control group, who represent patients who have been cured of stroke, had better accuracy than the patients' group, and this results from the presence of a significant effect of stroke on the group of patients, especially in three factors Abnormal head posture, Pupil anomalies, and Facial weaknesses. We especially considered the type of sign and if this affected accuracy. Although many of these signs went unnoticed, identification of abnormal head posture, ptosis, strabismus, and nystagmus all had high accuracy, between (40%-78%) for the patients' group and (70%-93%) for the control group. In any event, it was unable to reliably detect pupil irregularities. Therefore, these reports are typically accurate, while unique ocular signs that are readily "visible" are recognized by the multidisciplinary team. [27,28,29]

In comparison, the Vision assessment of the control group after the stroke with before this study showed that visual inattention, ptosis, and eye movements were found to be a high percentage for patients' group were found less percentage for the control after stroke. [30]

Conclusion

In conclusion, this study showed that stroke has a big impact on the vision signs of patients were got higher percentages of diseases for patients. This study that, our results showed in the measure of visual accuracy for both groups, where it was found that the control group, who represent patients who have been cured of stroke, had better accuracy than the patients' group, and this results from the presence of a significant effect of stroke on the group of patients, especially in three factors Abnormal head posture, Pupil anomalies, and Facial weaknesses.

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