

Silent Strokes is a Risk for Epilepsy in Elderly Population

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ABSTRACT

Purpose: To show the significance of silent strokes among middle age and elderly patients having late onset epilepsy.

Methods: This cross-sectional study (survey) was carried out at Rizgary Teaching Hospital, Erbil, Iraq from January to May, 2010. Patients were included in this study if they were middle aged and elderly patients (age range 50 and above) having unprovoked acquired first seizure or multiple seizures, previously or recently diagnosed as epileptic regardless the number of fits which could be single or multiple, having history of recent or old stroke or TIA and now presented with seizure.

100 Iraqi patients were included in this survey. The MRI images were examined and interpreted through collaborative discussions between a consultant Radiologist and a consultant Neurologist (T1, T2 and FLAIR sequences were obtained) and almost all patients had abnormal EEG studies.

Data were tabulated and analyzed, the significance of certain parameters was measured using chi square test, p-value of ≤ 0.05 was considered statistically significant.

Key findings: In this study males outnumber females, epilepsy was mostly observed in elderly population (70-79 years) and p value was not significant regarding sex differences in the studied sample. Silent strokes were observed mostly in elderly population (63-67%). Hypertension, hyperlipidemia, smoking, and old strokes are the commonest comorbidities observed in

relation to epileptic patients with silent strokes, and partial secondary generalized epilepsy type was the commonest epilepsy variety observed (73%) followed by partial complex epilepsy (12%) and simple partial epilepsy (11%).

Significance: Silent strokes were common in elderly patients having epilepsy (53%), especially patients having stroke risk factors like hypertension, and its prevalence increase with age. Silent strokes can be an indirect way to establish the causes of epilepsy in elderly population as having silent cortical ischemia.

Key words: Epilepsy, Elderly, Silent strokes.

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INTRODUCTION

Stroke is defined as the sudden occurrence of a non-convulsive, focal neurological deficit lasting more than 24 hours.^{1,2} Pathologically speaking, stroke falls into three subtypes, ischemic stroke (about 80%), Primary intra-cerebral hemorrhage (about 15%), and subarachnoid hemorrhage (about 5%). Cerebral ischemia usually caused by a reduction in blood flow that lasts for several seconds to a few minutes.³⁻⁵

Silent cerebral infarction (SCI) is defined as a brain lesion that is presumably a result of vascular occlusion found incidentally by magnetic resonance imaging (MRI) or computed tomography (CT) or when small blood vessels in the brain become blocked or ruptured without signs and symptoms in otherwise healthy subjects or discovered during autopsy.^{6,7} SCIs also termed covert infarcts or simply MRI infarcts.⁸

SCIs may occur without apparent clinical manifestations, however, either because the patient and family are unaware of minor symptoms or a so-called silent area of brain has been affected.⁹ The SCIs are frequently demonstrated in the subcortical white matter or the basal ganglia in stroke patients and elderly subjects.¹⁰

Since MRI or CT scan is a routine investigation for every epileptic patient, except patients with documented Petite mal, or Idiopathic generalized epilepsy variants, we tried in this study to estimate the presence of SCI discovered incidentally in elderly patients having single or multiple unprovoked seizures or epilepsy, It is very well known that epilepsy is a cortical phenomenon and silent strokes are mostly is a subcortical disease, but the presence of these silent strokes can be an indirect sign of more wide spread atherosclerotic changes causing very small cortical infarcts that cannot be visualized by regular CT scan or MRI sometimes, and these cortical SCI can be the focus of epileptic discharges.

Stroke is the commonest cause of seizures and epilepsy in the elderly population, it occur in about 10% of stroke patients. 5% are early-onset seizures (within the first days after the stroke) and another 5% are late-onset seizures (within 6 to 12 months after the stroke).¹¹ In addition to that the onset of seizures in late life is associated with a striking increase in the risk of stroke.¹² C.Y Sung and N. S. Chu reported that 23 out of 118 patients had Silent infarcts in their CT scans as they were investigating the relation between thrombotic stroke and epilepsy in elderly population.¹³

PATIENTS AND METHODS

This cross-sectional study (survey) was carried out in Rizgary Teaching Hospital, Erbil, Iraq from January to May, 2010. Patients were included in this study if they are middle aged and elderly patients (age range 50 and above) having unprovoked acquired first seizure or multiple seizures, previously or recently diagnosed as epileptic regardless the number of fits which could be single or multiple, having history of recent or old stroke or TIA and now presented with seizure. Patients with different CNS pathology were included (like brain tumors) to estimate the percentage of Silent stroke in between all patients. Patient with multiple sclerosis or leukodystrophy, seizures since early childhood or family history of hereditary epileptic syndrome and metabolic cause of seizures were excluded from the study. 100 patients were included in this study. Verbal informed consent was taken from the patients after explaining the design and aims of the study, and all had no objection to participating in the study. The Research Committee at the College of Medicine/ Hawler Medical University approved the study protocol. A questionnaire form was used to collect information from the patients regarding general health and history of medical diseases, such as, hypertension, diabetes mellitus

(DM), coronary heart disease, smoking and other vascular risk factors. Subjects were examined for physical and neurological signs or features of possible silent strokes, such as, exaggerated reflexes, pyramidal weakness, mild cerebellar signs, sensory signs, or long tracts signs. The MRI images were examined and interpreted through collaborative discussions between a consultant Radiologist and a consultant Neurologist (T1, T2 and FLAIR sequences were obtained). The MRI scanner was Siemens 1.5 tesla (Siemens, Erlangen, Germany). Silent infarcts were considered if they were smaller than 15 mm in diameter involving the subcortical white matter, and periventricular structures such as basal ganglia, thalamus, and internal capsule. Participants were investigated for dyslipidemia (serum cholesterol more than 200 mg/dl, and serum triglyceride more than 150 mg/dl) and almost all patients had abnormal EEG studies.

The Statistical Package for Social Sciences version 15 (SPSS Inc., Chicago, IL, USA) was used for data analysis. Chi square test was used for association between SCIs and risk factors. Student t-test was used to compare the means of 2 numerical variables. A p-value of ≤ 0.05 was considered statistically significant.

Table 1: Distribution of sample by gender.

Age (years)	Male		Female		Total		P
	No.	%	No.	%	No.	%	
50-59	12	19.67	8	20.51	20	20	0.8
60-69	16	26.23	12	30.77	28	28	
70-79	30	49.18	16	41.03	46	46	
80 and above	3	4.92	3	7.69	6	6	
Total	61	100.00	39	100.00	100	100	

Table 2: Prevalence of silent strokes by age.

Age (years)	N	Male	Female	Total	% (for each age group)
50-59	20	6	1	7	35
60-69	28	9	4	13	46
70-79	46	22	7	29	63
80+	6	2	2	4	67
Total	100	39	14	53	53

DM: Diabetes Mellitus, CAD: coronary artery diseases, AVMs: arteriovenous malformations

Table 3: Co-morbidities observed in epileptic patients

Comorbidities	Male n = 61		Female n = 39		Total n = 100	
	No.	%	No.	%	No.	%
Hypertension	31	50.8	29	74.4	60	60
DM	10	16.4	10	25.6	20	20
Hyperlipidemia	16	26.2	15	38.5	31	31
CAD	8	13.1	8	20.5	16	16
Smoking	32	52.5	2	5.1	34	34
Old stroke	26	42.6	10	25.6	36	36
Brain tumors or metastasis	6	9.8	6	15.4	12	12
AVMs	4	6.6	0	0.0	4	4
Alzheimer Disease	11	18.0	1	2.6	12	12

Table 4: Radiological manifestations observed in the studied sample.

MRI results	No	%
Silent strokes	35	35%
Silent strokes and major stroke	18	18%
Only major stroke	16	16%
Brain tumors or metastasis	12	12%
AVMs	4	4%
No finding	14	14%

RESULTS

Table 1 shows that more than half (61%) of patients were males. No significant differences in the age distribution of both sexes was detected (P = 0.8). It is evident in the same table that 46% of patients were in the age group 70-79 years.

All patients included in this study were nearly from same ethnic background, they were all Iraqi Muslims and mostly Kurdish, living in Kurdistan region in the North of Iraq.

Table 2 shows that the highest prevalence of silent strokes was among patients aged 70 years and more. Around three quarters (73.6%) of silent strokes patients were males (39 out of 53 patients).

Hypertension was the commonest comorbidity observed in the studied sample which is also the most common risk factor for having both silent strokes and major haemorrhagic and ischemic strokes. The second common risk associated with the presence of epilepsy in elderly population is history of old stroke (36%), while smoking (34%) and hyperlipidemia (31%) are also common risks of association to silent stroke in the studied population.

The most common type of fit observed in the studied sample is partial or focal secondary generalized fits depending on family and witnesses descriptions and sometimes personal observation (73%), Generalized Tonic-Clonic fits were described by very few patients. (Fig 1).

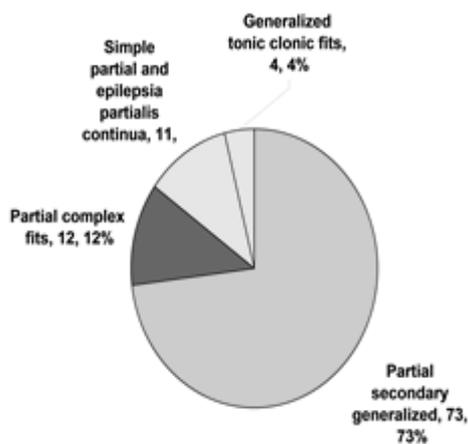


Figure 1. Distribution of sample by type of fit

Silent strokes alone were observed in 35 % of patients, while silent strokes in association with major stroke features were observed in another 18% of patients, another 16% of patients showed only major stroke; 28% of Patients had history or radiological features of anterior circulation stroke and 8% had posterior circulation stroke or combination. Some patients had no clear radiological cause for their epilepsy.

DISCUSSION

Most communities around the globe had substantial increase in the elderly population, including the Kurdish community in Iraq, partly because of the increase in medical awareness and the new medical managements of most medical and surgical conditions that increases mortality including Hypertension and coronary heart diseases, as a results new fields of Medical illnesses start to increase which may be related partially to aging process like Alzheimer disease and strokes including silent white matter ischemic strokes, Garrard J, et al. mentioned that The prevalence of AED use was 10.5% across all elderly nursing home residents.¹⁴

In this study I suggested that the estimation of the presence of those silent strokes may be an indirect way to relate epilepsy in elderly to small hidden ischemic cortical events that may represent a focal abnormal epileptic discharge.

The elderly have higher frequency of seizures activities, which can lead to serious consequences. The elderly differ from the young in that they may have many medical conditions that predisposes to epilepsy syndromes, like having numerous concomitant drugs, having different metabolic characteristics, and the presence of concomitant neurodegenerative, cerebrovascular, or neoplastic disease.

As many as 20% to 30% of epileptic patients may be misdiagnosed as psychiatric disorders or cardiovascular diseases like arrhythmias. Many of elderly epileptic patients may have cardiovascular syncope, with abnormal movements due to cerebral hypoxia, which may be difficult to differentiate from epilepsy on clinical grounds.¹⁵⁻¹⁷

In our studied sample we found that epilepsy type was partial secondary generalized in 73% of patient and partial complex type in 12.12% both these types are the expected types of epilepsy in elderly population since, it is mostly related to some focal pathological process like stroke, SCI, neoplasm, and AVM involving the cerebral cortex while generalized epilepsy (4.4%) which is mostly hereditary in nature affects younger age patients, patients exposed to anoxic-ischemic encephalopathy or metabolic brain diseases and neurodegenerative diseases patients which is less common pathological process observed in our studied population, nearly the same have been described by Hiyoshi T, and Yagi K¹⁸ they described that partial epilepsy was the epilepsy type in 76.3% of their studied sample, in addition to that Twenty-nine of 33 patients with generalized epilepsy were idiopathic in their studied sample, whereas all patients with partial epilepsy were symptomatic.

Simple partial and Epilesia partialis continua was the presenting epilepsy type in 11% of our studied sample. According to Rumbach L and his colleagues, post stroke seizures may present initially with status epilepticus or one of its variants.¹⁹

Hypertension was the commonest associated factor in my studied sample as a cause for both established major stroke and silent strokes this had been observed by many other authors.²⁰⁻²³ The other common risk factors associated with the epilepsy in elderly population is history of previous major stroke, smoking, hyperlipidemia and DM.

The prevalence of SCIs increases in patients with symptomatic strokes ranging from 10-40%.²⁴⁻²⁶ A prevalence of 13% was reported in a small population study²⁵ of normal subjects but in a study on a large number of elderly subjects (age more than 65 years) the prevalence reaching up to 33%.²⁶ Several studies have examined the incidence of SCIs and its relation to risk factors for recurrent symptomatic strokes and cognitive disorders.²⁷⁻²⁹ The majority of these studies had also demonstrated that age and hypertension strongly and independently correlated with SCIs.³⁰ In this study 35% of patients with epilepsy showed radiological evidences of SCI, in addition to 16% of patients showed features of old major stroke, and 18% showed a combination of major stroke and some silent strokes, that makes silent strokes an important risk factor predicting the cause of epilepsy in elderly patients and may be the most important factor that may lead to epilepsy in the elderly population, and treating or stopping the

formation of new silent strokes is of prime importance for decreasing the incidence of epilepsy in elderly people by frequent checking and managing risk factors of stroke like hypertension, DM, hyperlipidemia and other risk factors.

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