

Evaluation of Seizure Attacks in Patients with Cerebrovascular Accident

Ebrahim Koochaki,¹ Reza Daneshvar*¹

1. Department of Neurology, Kashan University of Medical Science, Kashan, Iran

Article information	Abstract
<p>Article history: Received: 9 Oct 2011 Accepted: 18 Jan 2012 Available online: 5 Nov 2012 ZJRMS 2013; 15(4): 29-32</p> <p>Keywords: Seizure Attacks Stroke Cerebrovascular Accidents IVH ICH SAH</p> <p>*Corresponding author at: Department neurology, Kashan University of Medical Science, Kashan, Iran E-mail: redaneshvar@gmail.com</p>	<p>Background: The most common reason for seizure in elderly duration is the stroke. This study was conducted aiming to assess the frequency of seizure attack occurrence in those patients.</p> <p>Materials and Methods: This investigation was carried out through a cross-sectional method for one year on 330 patients admitted to the neurology ward as diagnosed with stroke. The required data was collected through the researcher-made questionnaire from the patients suffering from stroke which was diagnosed based on clinical findings, CT-Scan and MRI as required.</p> <p>Results: Among 330 patient suffering from stroke (162 men and 168 women), 48 cases (14.5%) were suffering from seizure. Six percent of the patients had early seizure and another 8.5% had late seizure. Among 162 men suffering from the stroke, 32 ones were without seizures and 30 men were suffering the seizure. A number of 150 women out of total 168 ones suffering from the stroke, had no seizure and 18 others had seizures; frequency of seizure occurrence was more in male samples ($p=0.044$). In the people under 60 year, there were mostly early types of seizure (45%) and in the age range above 60 year, it was mostly late type (89.3%). A 68.5% of the patients suffering from the seizure had experienced ischemic stroke. However, the frequency of seizure occurrence in the patients with hemorrhagic stroke was statistically greater ($p=0.003$).</p> <p>Conclusion: This examination showed that occurrence of seizure attacks in the people with stroke is 14.5% and it is seen more in the hemorrhagic strokes than ischemic ones. The frontoparietal area is the most common location involved and tonic clonic was the most common seizure in the patients suffering from it who have experienced the stroke.</p> <p>Copyright © 2013 Zahedan University of Medical Sciences. All rights reserved.</p>

Introduction

In elderly people, the most common reason for seizure attacks is the stroke (nearly one-third to half of the cases) [1-5]. Risk factors for early seizure (2-4 weeks after the stroke occurrence) consist of bleeding, vast area of the stroke and the cortical involvement [6, 7]. Most of the early seizures (acute) are occurred within 48 hours after the beginning of ischemic strokes and subarachnoid hemorrhage is happened mostly within a few hours after the beginning [8].

Intracranial hemorrhage, subdural hemorrhage, injuries resulted from hypoxia and global cerebral ischemia and hypertensive encephalopathy might appear along with seizure attacks as well. Approximately, 35 percent of the patients with early seizure after the stroke are suffering from epilepsy. However, prevalence of epilepsy after the stroke is generally 5-9 percent [9, 10].

The relationship between the seizure attacks and the strokes was explained for the first time by Hughlings Jackson about a patient with cerebral embolism suffered from simple focal epileptic attacks.

Pathobiology of seizure attacks occurrences is relevant to the type of stroke, size and its location of involvement. Such attacks are seen more in intracranial hemorrhage, vast strokes and cortical involvement. Meanwhile, in the acute stage of the stroke, outbreak of changes such as cerebral edema, cytotoxic changes in the brain cells and

alterations in neurotransmitter activities, all are among predisposing factors in the occurrence of early seizure attacks. In addition to topical effective agents in the brain, systematic alterations including acidosis and electrolyte imbalance play a role in the occurrence of such early attacks [11].

For the time of early seizure attacks occurrence after the strokes, different moments have been considered. This time is different from 4 hours or 4-48 hours after the stroke to one, two, three and four weeks after it [11-15]. Early seizures have been reported in different studies in 1.4-11.4 percent of cerebrovascular accidents which consist of all types of stroke such as transient cerebral ischemia [16, 17]. Occurrence of late seizure attacks in the patients with early seizure attacks is 32 percent and it is 10 percent in the patients without early seizure attacks [14].

The present investigation is conducted in 2010 aiming to examine the incidence of seizure and its time of occurrence after the stroke as well as its relation with the location of the involvement in the patients admitted to Shahid Beheshti Hospital of Kashan. At the present time, there is no comprehensive data in Iran on the seizure occurrence in the patients suffering from the stroke and it is not still clear when it is occurred. Considering the fact that genetic differences and the level of access to health

facilities may affect the brain lesions happened by a cerebrovascular accident, this investigation was carried out on the population of the patients with the stroke.

Materials and Methods

All the patients with the stroke admitted to Shahid Beheshti Hospital of Kashan were evaluated; they were 330 people with an acute stroke who have been admitted during the last year. The sample size was measured based on the Cochran formula for determination of sample size in a population with a constant volume. The number of samples was calculated as 45 cases with 7% seizure prevalence and the confidence level of 95%. All the patients with the stroke were evaluated for the occurrence of seizures within one year and the cases whose attacks were not due to metabolic or sepsis disorders participated as the subject in the study.

Finally, 48 people were suffering from seizures which were investigated statistically. The seizure attacks which had been occurred within 14 days after the stroke occurrence were considered as early attacks and the ones happened after 14 days as the late attacks. The required data was collected from the patients' data sheet and were analyzed using SPSS-14 software based on Chi-square (χ^2), Pearson and Fischer statistical tests. The data so achieved were released in groups and private information and personal specifications were kept as confidential.

Results

330 people suffering from the stroke participated in the study whose frequency of seizure occurrence was 14.5 percent (48 persons). An extent of 6 percent of total patients had an early seizure and an 8.5 percent had a late seizure. The most common type of seizure in the patients with the stroke was the tonic clonic (35 people (72.9%)). In the patients with early and late seizure attacks, the tonic clonic was the most common seizure (Fig. 1). The early seizure is mostly occurred in the people under the age of 60 years and the late one is happened in the people above this age (Table. 1). 41.7 percent of the patients under study had early seizures and the remaining 58.3% had late seizures.

In this investigation, most of the patients with the seizure (68.5%) in both genders were in the group of the patients suffering from Ischemic stroke (Table. 2). In

respect of the type of cerebrovascular accident and the seizure occurrence, out of 330 patients suffered from the stroke, 54 ones were hemorrhagic and other 276 ones were ischemic.

In the hemorrhagic group, 15 patients had seizure attacks and in ischemic group, 33 patients had seizure attacks; the rate of seizures was statistically more in the hemorrhagic type ($p=0.003$) both in male ($p=0.051$) and the female ($p=0.038$) genders. The seizure was more prevalent in men ($p=0.044$) (Table. 2)

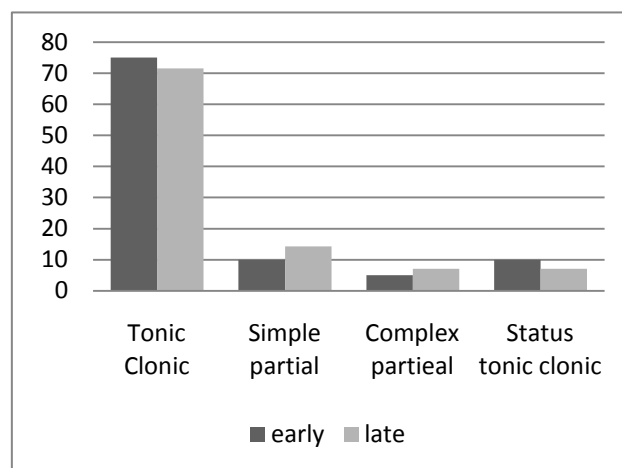


Figure 1. Frequency percentage of the types of seizures and the time of occurrence in the patients under study.

Table 1. Prevalence of seizure based on the gender

Seizure	Yes N(%)	No N(%)	Total	p-Value
Sex				
Male	30(18.6)	132(81.4)	162(100)	0.044
Female	18(10.7)	150(89.3)	168(100)	

Table 2. Frequency distribution of 48 patients suffering from the strokes with an experience of a cerebrovascular accident based on age and gender

Sex	Male	Female	Total
Age			
<50 years	7(23.3)	1(5.6)	8(16.7)
50-60	2(6.7)	2(11.1)	4(8.3)
60-70	5(16.7)	4(22.2)	9(18.7)
≤70	16(53.3)	11(61.1)	27(56.3)
Total	30(100)	18(100)	48(100)

Table 3. Gender frequency distribution of the patients suffered from the seizure attacks in terms of the seizure occurrence time and the type of cerebrovascular accident

Sex	Time	Type of stroke					Total
		Ischemic	Hemorrhagic ICH	IVH	SAH	ICH+IVH	
Male	Early	7(63.6%)	2(18.2%)	1(9.1%)	0	1(9.1%)	11
	Late	13(68.4%)	5(26.3%)	0	1(5.3%)	0	19
	Total	20(66.7%)	7(23.4%)	1(3.3%)	1(3.3%)	1(3.3%)	30
Female	Early	6(66.7%)	3(33.3%)	0	0	0	9
	Late	7(77.8%)	2(22.2%)	0	0	0	9
	Total	13(72.2%)	5(27.8%)	0	0	0	18
Total	Early	13(65%)	5(25%)	1(5%)	0	1(5%)	20
	Late	20(71.4%)	7(25%)	0	1(3.6%)	0	28
	Total	33(68.5%)	12(25%)	1(2%)	1(2%)	1(2%)	48

However, there was no significant difference in terms of the gender and the type of cerebrovascular accident (ischemic and hemorrhagic). The stroked area in the patients with the seizures was 56.3% frontoparietal, 31.3% occipitoparietal, 10.4% temporoparietal and 2.1% lacunar (Table. 3). The largest area of the stroke in both genders was also the frontoparietal lobe (60% in men and 5% in women).

Discussion

This study was conducted aiming to examine the frequency of seizure attacks in the patients with a cerebrovascular accident in 2010 as admitted to Sahahid Beheshti Hospital of Kashan. Mervi K et al. have reported seizure prevalence as 17% in the acute phase of the stroke [16]. Ahmadi et al. evaluated in their study 250 patients suffering from the stroke admitted to Shahid Yahyanejad Hospital, in terms of seizure attacks followed on the strokes in which 42 patients (16.7%) had seizure. As it is seen, the results of the aforesaid investigation are similar to those of the present study [18].

In a study carried out by Pinto et al, the rate of early seizure attacks were reported as 4-10%. In 2002, Khandaghi et al determined the occurrence of early seizure attacks in the patients with the stroke as 6.4% by evaluating 716 patients suffered from the stroke [19]. Alberti et al. calculated the prevalence of early seizures about 5% by examining 698 patients suffered from the stroke [20]. In their study, Lossius et al. reported the prevalence of early seizure followed on from the stroke as 5.6% by evaluating 484 patient suffered from the stroke [21]. The occurrences of early seizure attacks after the stroke have been calculated in several studies from 1.4 to 11.4 [11, 14, 22]. One of the reasons for such difference is a definition for the time considered for early attacks. This time has been different from 24 hours to 30 days after the stroke occurrence [11, 15]. Time definition in the present study has been considered as two weeks after the stroke occurrence. The occurrence of seizure attacks in the patients with strokes is 6.6%. In terms of the time considered for early seizure attacks, this study is similar to the investigation conducted by Kilpatrick et al. on 1000 patients [14]. In the afore-mentioned investigation, the frequency of early seizure attacks occurred after the stroke has been assessed as 4.4 percent. The findings of the present study is more than those of the study carried out by Kilpatrick in respect of frequency of early seizure attacks; however, it is at the middle of different studies (1.4-11.4%) [11, 14, 22]. It is likely that some factors including genetic differences, further prevalence of pneumonia aspiration and sepsis after it and/or electrolyte disorders may affect the greater number of our patients. The present study cannot explain the reason of such difference.

The average age of the patients with the strokes followed by the seizure has been 68 years (age range of 40-90 years). The number of female patients has been more than the male ones, but the cases with the seizures

after the stroke are occurred more in male patients (59.5%).

In our study, the seizure resulting from the hemorrhagic stroke is more than the ischemic one. In the investigation carried out by Khandaghi, the frequency of seizure in subarachnoid hemorrhage and embolic stroke was more than that in intracranial hemorrhage and thrombotic stroke [19]. And in their study, Mervi et al. found that the most frequent seizure is occurred in subarachnoid hemorrhage (35%) [16]. In a study conducted by Vespo et al, early seizure attacks in intracranial hemorrhage was reported as 27% and in cerebral ischemia as 6% [23]. As the results of the research conducted by Szaflarski et al. shows, the seizure attacks were more frequent in the patients with cardioembolic and hemorrhagic strokes [24].

Ronal et al. concluded that 16% of the patients had seizures following an ischemic stroke and 14% of them had it following a hemorrhagic stroke [25]. In the investigation carried out by Ahmadi, 54.8% of the seizures have occurred along with ischemic strokes and the remaining 45.2% have happened with hemorrhagic strokes [18]. The prevalence of seizure in most of the studies has been rather in hemorrhage form which is consistent with our investigation. The reason for higher prevalence of ischemic stroke in Ahmadi's research might be the greater number of the ischemic patients. Though in our study, the frequency of seizure in hemorrhagic patients is more than that in ischemic ones, the frequency of seizure in hemorrhagic patients is less than the European statistics. The seizure attacks in cortical hemorrhages is more than deep hemorrhages like basal and thalamus ganglions and the reason for deeper hemorrhages is hypertension, while the cortical hemorrhages are rather associated with the reasons for cerebral aneurysms, arterial amyloidosis and arteriovenous malformations that may be occurred due to the lack of optimal control of hypertension in our society compared to develop countries.

In our study, the stroke area in 56.3% of patients with the seizures is frontoparietal, in 31.1% as occipitoparietal. 10.4% as temporoparietal and 2.1 as lacunar. In the research carried out by Isaac et al, the involvement of several brain lobes of brain has been more risky in terms of the seizure occurrence and the seizure has been found also in subcortical infarcts, but no seizure has been reported in the thalamus involvement [26].

The tonic clonic seizure is the most common type of seizure among the patients suffered from the stroke. In the patients with early and late seizures, it is the most common type as well. In an investigation conducted by Gupta et al, most of the seizure cases have occurred after a simple partial stroke [27]. In this study, the frequency of continuous tonic clonic seizure has been 8.3% and it was 9% in the research carried out by Velioglu [28].

In all other studies, complex partial seizure has been mentioned as the most common type. In case the patients with such type of seizure are not treated, they will suffer from a generalized seizure. Since the seizure prevalence issue in our investigation is somewhat close to all the

studies in Iran and other countries, it seems that any delay in seizure diagnosis will cause not to diagnose the patients suffered from partial and complex epilepsy until they will have the first generalized seizure attack. Thus, our statistics in this group is more than all other investigation.

The results of this study showed that the occurrence of seizure attacks in the patients with stroke has been 14.5% and it has been found in hemorrhagic stroke more than all other types of stroke. It is necessary in the patients with the stroke to take the symptoms of complex partial seizures into consideration more precisely in order to diagnose and treat them before being generalized. Further studies are suggested to determine the role of anticonvulsant drug therapy in order to prevent seizure attack occurrences in the patients suffered from the stroke based on the type and the area of that stroke.

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Authors' Contributions

All authors had equal role in design, work, statistical analysis and manuscript writing.

Conflict of Interest

No conflict.

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