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Magnetic Resonance Imaging Findings in Hospitalized Children with a Final Diagnosis of Seizure in Golestan Hospital

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Abstract

Background: Seizure disease is a clinical manifestation of synchronized and elevated abnormal discharge of neurogens originally present in the cerebral cortex. This sudden abnormal cerebral stimulation is intermittent and usually short-lived and self-limiting, which lasts from a few seconds to a few minutes.
Methods: In the present study, which was conducted at Ahvaz Golestan hospital, 200 children aged 2 months to 14 years old with seizure that had referred to the Magnetic Resonance Imaging (MRI) ward in 2013, were studied. Information regarding the patients was extracted during the study, included the patient's gender, age, presence of fever, cause of seizure, type of seizure, date of referral, presence of Status Epilepticus (SE), duration of hospitalization, deaths caused by the seizure, and neurological examination.
Results: According to the obtained results, it was found that out of a total of 200 selected patients, about 128 (64%) were male and 72 patients (36%) were female. The average age in male and female patients was 26.4 and 25. 5 months, respectively.
Conclusion: The results showed that percentage of catching among males and females was 65.5% and 34.5%, respectively. Febrile seizure had the highest percentage (68.2%), which means it was of higher importance, so that among 200 selected patients, febrile seizure involved 137 patients and, as indicated, its value was much higher than other factors.

Keywords: Seizure, Status Epilepticus (SE), Fever, MRI

1. Background

Seizure is an aggressive and time-limited change in behavioral activity and the result of abnormal electrical activity of the brain (1). Seizures usually occur in children, found approximately in 10% of children (2). Seizures are caused by extra-brain disorders, such as high fever, infection, head trauma syncope, hypoxin toxin or cardiac arrhythmia. Less than one-third of seizures in children were caused by epilepsy, a condition in which seizures occur iteratively (3). A seizure may have different causes; seizures associated with fever are one of the main causes of hospitalization of children aged 5 to 6 in pediatric wards of hospitals (3). These types of seizures account for about 3% to 4% of seizures in European countries (4), so that this type of seizure has a direct correlation with the increase in body temperature and, when it occurs, the body temperature rises up to 29°C (5). A simple (typical) form can usually be converted to a generalized (tonic-clonic) form in a few seconds to 10 minutes, which can be repeated, at most, 3 times within 24 hours (6). The mechanism of febrile seizure is still unknown. However, what is certain is that many etiologic factors play a role in this process, and it is not just fever that causes seizures in these individuals (7); it is better to say that fever in children is needed for seizure, yet it is not the only condition associated with seizures. Genetics has proven to be a major contributor to the development of this type of seizure (8), so that genetic studies have shown that the gene for the disease is located on P13, P19, and P21 chromosomes. Furthermore, dominant and autosomal transmission has been indicated in some families (6). The febrile seizure trend is appropriate in most cases, and the likelihood of developing epilepsy in the future depends on several risk factors. The most important factors are family history of epilepsy in children, the occurrence of first attack before the age of 9 months, the atypical cases and neurological abnormal findings. In cases, in which a large number of risk factors are associated with each other, the incidence of epilepsy is reported to be about 9%, yet when there is no risk factor, it is about 1% (9). In this study, it was decided to study the results of MRI for seizure of different reasons in the age group of children up to 14 years

old, who referred to Ahvaz Golestan hospital.

2. Methods

This retrospective cohort study was performed on 200 children aged 2 months to 14 years, who were referred to Golestan hospital of Ahvaz during year 2013 due to seizure disorder after obtaining permission from the ethics committee of Ahvaz Jundishapur University of Medical Sciences. The number of samples was determined based on the sample size formula. After reviewing the records of the patients referring to the illness in question, patients who showed the final diagnosis of false seizures were excluded from the study and only those patients, who underwent MRI for the final diagnosis of seizure type, were evaluated. Therefore, after deleting the files of patients, who were referred for false seizures and did not undergo MRI, only 200 patients remained in the study and were evaluated in the final analysis. Patient information that was extracted during the study included the patient's gender, the exact age of the patients, fever, seizure, cause of the seizure, type of seizure, history of referral, Status Epilepticus (SE), hospitalization duration, deaths caused by the seizure and neurological examination. In order to analyze the results, descriptive statistics were usually used. All the obtained data were entered in the SPSS software (version 19) and analyzed. Charts and tables for all statistical analyzes were obtained from the SPSS software (Table 1).

Table 1. Variables of All Patients

Row	Specifications	Definition	Measuring Scale of Variable
1	Age	Life duration	Month/Year
2	Gender	Sex	Male/female
3	Fever	temperature above oral 37.8°C with anal 38.3°	Yes/no
4	Cause of seizure.	The factor that has been causing based on the final diagnosis	Depending on the final diagnosis recorded in the case
5	Type of seizure	Different types of seizures	Clinical and by observations
6	Death due to seizure	End of life	Occurred/not occured
7	A season of the year that the patient suffered a seizure	Before hospitalization	Based on the month of hospitalization
8	SE	From a seizure that lasts more than 30 minutes to frequent seizures in which person will not be alert at its intervals.	Is/is not
9	Neurological examination	According to Barnara Bish (16)	Normal/abnormal

Table 2. The Number and Percentage of Patients Included in This Study by Gender

Gender	Number	Percentage of Patients	Physical Percentage
Male	121	65.5	65.5
Female	69	34.5	100

Table 3. Different Causes of Seizure in Children

Various Reasons for Seizures	Number per Group	Percentage of Each Group by Separation	Seizure Percentage	Cumulative
Fever	137	68.2	62.5	62.5
Epilepsy	34	16.9	0.17	85.5
Infection	3	1.5	1.5	0.87
Brain trauma	5	2.5	2.5	89.5
Poisoning	3	1.5	1.5	0.91
Metabolic seizures	5	2.5	2.5	93.5
Dyspnea	1	0.5	0.5	0.94
Unknown seizures	12	0.6	0.6	100
Total	200	99.5	100	100
Death	1	0.5	-	-

3. Results

The mean age of the participants in this study was 26.4 months for male and 25.2 months for female patients. The highest percentage of catching was in the age group of 1 to 2 years old at a rate of 20% and then for ages between 2 and 5 years at about 19.5%, and for the male gender. Table 2 shows the number and percentages of different patients with seizure shown by MRI. According to the table, the results could be compared and evaluated (Table 3). Table 4 specifies the percentage and number of patients by gender based on fever.

4. Discussion

Table 2 shows the number and percentage of individuals participating in this study according to gender and age. According to the table, the number of male patients with seizure was much higher than that of the female gender. As the percentage of males was 65.5% and females 34.5%, females experienced seizure at a rate of about half of the males, which indicates a higher risk of the male gender to seizures. The frequency distribution of patients of

Table 4. The Percentage of Seizures Resulting in SE

SE	Number	Percentage	Cumulative percentage
Yes	63	21.5	21.5
No	137	68.5	100
Total	200	100	100

different ages of the studied population showed that the highest percentage of catching occurred at 1 to 2 years, at a rate of 20%, and then from 2 to 5 years old, at about 19.5%, for the male gender. For the female gender, the same trend was observed, where the rate was 14.5% and 9.5% for 1- to 2-year-olds, and 2- to 5-year-olds, respectively. Table 3 shows the number and percentage of different patients with seizure shown by MRI; according to the results, it is clear that febrile seizure, at 68.2%, had the highest percentage and in other words, it had a greater significance, so that among the 200 selected patients, febrile seizure involved 127 patients, which was higher than the sum of all the other factors. Therefore, seizures should be carefully observed and considered. The significance of this issue is clearly indicated in graphs. Table 4 shows the percentage of seizure leading to SE. According to the results of the tables, it could be indicated that seizures could lead to SE by about 31.5%. Table 5 indicates fever and body temperature for patients by gender, which showed that fever caused by seizure was higher in males; this could be due to the higher resistance of males compared to females. Or in other words, the female gender is more sensitive and weaker against fever than males.

Table 5. Percentage of Seizures Leading to SE

Gender	Number of Patients	Minimum Fever	Maximum Fever	Mean Fever ± Standard Deviation	Variance
Male	131	26.1	20.6	68.55 ± 1.22	1.198
Female	69	36.4	29.8	38.48 ± 1.01	1.03
Total	200	-	-	-	-

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