응급실을 방문한 소아청소년 뇌전증지속증 환자의 임상적 특징 및 날씨와의 관계

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Clinical Characteristics and Weather Effects on Pediatric Status Epilepticus Patients Visiting the Emergency Room

Purpose: To evaluate the clinical characteristics and outcomes of pediatric status epilepticus (SE) patients visiting the emergency room and to determine the association between pediatric SE and the weather factors.

Methods: We retrospectively analyzed 81 pediatric (<19 years of age) SE patients visiting the emergency room (ER) of Samsung Changwon Hospital from January 2005 to June 2016. We analyzed clinical characteristics including etiology, duration of seizure, seizure type, use and number of antiepileptic drugs, and outcomes on visiting the ER in pediatric SE patients. We investigated the association pediatric SE and weather factor such as temperature (°C), diurnal temperature range (DTR) (°C), and atmospheric pressure (AP) (hPa). The statistical methods used were the Chi-square test and Mann-Whitney *U* test.

Results: We estimated that the annual incidence of pediatric SE in Changwon City is at least 2.9 per 100,000 children per year. Febrile SE was the most common etiology for patients under 7 years and idiopathic SE was the most common etiology in patients over 7 years. The most common type of seizure was generalized convulsive type (88.9%). The mortality rate was 4.9% and new neurological sequelae occurred in 3.7% of cases. Additionally average AP and minimum AP on present SE day were significantly lower than no SE day.

Conclusion: Our study indicates that there was a high rate of refractory SE and a lower rate of new neurologic sequelae than previously reported. Also we found significant relationship observed between pediatric SE and AP especially average AP and minimum AP.

Key Words: Status epilepticus, Pediatrics, Changwon, Emergency room, Weather

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Introduction

Status epilepticus (SE) was defined in 1993 by the International League Against Epilepsy (ILAE) as a continuous seizure lasting more than 30 minutes or a period of serial epileptic seizures longer than 30 minutes during which function is not regained between ictal events^{1,2)}. Refractory SE was defined as SE not responsive to initial therapy with adequate doses of two or three anticonvulsant medications,

or SE lasting 60 minutes or longer²⁻⁴). SE is the most common life-threatening pediatric neurological disease and is associated with high morbidity and mortality. The incidence of SE is estimated at 18 to 23 per 100,000 children per year. Several studies have reported the prevalence of refractory SE among SE patients from 11% to 43%³) and the mortality rate has been reported to vary from 2% to 8.3%^{3,5}). Few papers have reported on pediatric SE in Korea. The mortality rate of pediatric SE in these studies have similarly varied, from 0.1% to 6.4%, and the rates of neurologic sequelae after pediatric SE have varied from 5.6% to 32.3%⁶⁻⁸).

Someone thought that an epileptic seizure is a sum of multiple distinct endogenous and exogenous factors affecting an epileptic focus. Several reported that seizure frequency of epileptic patients was influenced by weather changes, especially atmospheric pressure and different seasons. Also, higher degree of humidity, high temperature and cloudy days were protective factors⁹⁻¹³).

In this study, we evaluated the clinical characteristics and outcomes of pediatric SE patients visiting the emergency room (ER) in Changwon. Also we additionally investigated the association between pediatric SE and the weather factors.

Materials and Methods

1. Data collection

We retrospectively reviewed the medical records of 89 pediatric SE patients under 19 years of age who met the inclusion criteria for this study and visited the Samsung Changwon hospital ER from January 2005 to June 2016. Eight patients were excluded due to insufficient clinical and laboratory data. The final study population consisted of 81 pediatric SE patients. Study data collected included age, sex, time of arrival to the ER, etiology, final diagnosis, type of seizure, duration of seizure, type of antiepileptic drug, new neurological sequelae, and death. SE was classified into four categories based on previously described criteria¹⁴⁻¹⁶). Acute symptomatic SE was defined as SE developing due to acute neurological insult, such as trauma, central nervous system infection, metabolic disturbance, or systemic disorder. Second, remote symptomatic SE was defined as SE occurring in patients with particular neurological disorders (chronic encephalopathies) predisposing them to epileptic seizures, including cases due to previous congenital or acquired epileptogenic brain damage. Some investigators create a separate category of progressive encephalopathies, whereas others include them with remote symptomatic SE¹⁶). Third, idiopathic SE also termed cryptogenic, included epileptic patients who had SE due to sudden disconti-

nuation of antiepileptic medication or patients with SE without an underlying lesion in the central nervous system or any causal brain damage. Finally, febrile SE included epileptic seizures accompanied by a fever lasting more than 30 minutes, with cerebrospinal fluid analysis indicating nothing in favor of central nerve system (CNS) infection³). Additionally, daily meteorological data for Changwon were obtained from the Korea Meteorological Administration (KMA) website (www.kma.go.kr). Variables analyzed included daily mean temperature (°C), maximum temperature (°C), minimum temperature (°C), rain or snow, degree of humidity (%), and atmospheric pressure (AP) (hPa).

2. Statistical analysis

All of the analyses were conducted using SPSS 21.0 software (IBM, Inc., IL, USA). Descriptive statistics were reported as median and ranges for continuous variables, frequency and percentage for categorical variables. Kruskal-Wallis test, Mann-Whitney *U* test and Chi-square test were used for comparing the clinical characteristics among the different age groups and investigating the association pediatric SE and weather factors. A statistically difference was defined as a *P*-value ≤ 0.05 .

3. Ethics statement

This study was approved by the Institutional Review Board of the Samsung Changwon Hospital (2016-SCMC-034-00).

Results

1. Demographic characteristics of patients

In our study, we divided patients into three groups by age: under 2 years (<24 months), 2-6 years (24-84 months) and over 7 years (≥ 85 months). There were 39 girls (48.1%) and 42 boys (51.9%) in this study. The most common type of seizure was generalized convulsive (88.9%). The median (range) duration of seizure before ER, after ER, and in total were 40 (5-330), 10 (0-248) and 65 (30-360) minutes, respectively. The number of anti-epileptic drugs (AED) used by patients were 0 (6.2%), 1 (22.2%), 2 (45.7%) and more than 3 (25.9%) (Table 1). The most common visiting time in day was between 18:00 to 19:59 and the least common visiting time was between 02:00 to 03:59. January was the most common month and October was the least common month of ER visits (Fig. 1). Among all 81 patients with pediatric SE, 48 (59.3%) suffered from refractory SE (Data not shown). The most common patient age was 1 year old and the least common patient ages were between 14 and 18 years old (Fig. 2). Eight patients were transferred to other hospitals; one of them

died and two developed new neurologic sequelae.

2. Etiology, duration and outcome of SE

The etiology of the pediatric SE patients in this study was as follows. Three (3.7%) patients had acute symptomatic SE, 9 (11.1%) had remote symptomatic SE, 31 (38.3%) had idiopathic SE, and 38 (46.9%) had febrile SE. The frequency of seizure duration was 33 (40.7%) lasting <1 hour, 31 (38.3%) lasting 1-2 hours, 16 (19.8%) lasting 2-6 hours and 1 (1.2%) lasting ≥6 hours. Four patients (4.9%) died and 3 (3.7%) developed new neurologic sequelae after SE. Patients with seizures lasting 1-2 hours most frequently developed new neurologic sequelae (Table 2).

Table 1. Demographic Characteristics, Type of Seizure, Duration of Seizure and Number of Antiepileptic Drugs Used in Study Patients

	Total (n=81)	< 24 months (n=25)	24-84 months (n=34)	≥ 85 months (n=22)	P- value
Age	42 (1-226)	14 (1-24)	43.5 (25-82)	143 (89-226)	<0.001
Sex					0.977
Boys	42 (51.9)	13 (52.0)	18 (52.9)	11 (50.0)	
Girls	39 (48.1)	12 (48.0)	16 (47.1)	11 (50.0)	
Type of SE					0.922
Generalized	72 (88.9)	22 (88.0)	30 (88.2)	20 (90.9)	
Focal	3 (3.7)	1 (4.0)	1 (2.9)	1 (4.5)	
Atonic	2 (2.5)	-	1 (2.9)	1 (4.5)	
Etc.	4 (4.9)	2 (8.0)	2 (5.9)	-	
Duration of SE					
Before	40 (5-330)	30 (5-180)	42.5 (15-330)	45 (15-268)	0.015
After	10 (0-248)	10 (0-120)	6 (0-100)	8.5 (0-248)	0.645
Total	65 (30-360)	60 (30-190)	71.5 (30-345)	67.5 (30-360)	0.385
Number of AEDs					0.747
0	5 (6.2)	1 (4.0)	2 (5.9)	2 (9.1)	
1	18 (22.2)	6 (24.0)	9 (26.5)	3 (13.6)	
2	37 (45.7)	10 (40.0)	17 (50.0)	10 (45.5)	
≥3	21 (25.9)	8 (32.0)	6 (17.6)	7 (31.8)	

SE, status epilepticus; Etc., et cetera; AED, antiepileptic drug.

3. Effects of the weather on pediatric SE

We investigated the association between weather factors and pediatric SE who visited ER. We used the weather factors such as rain or snow, mean temperature (°C), maximum temperature (°C), minimum temperature (°C), diurnal temperature range (°C), degree of humidity (%), average AP (hPa), difference between yesterday's AP and today's AP (hPa), maximum AP among the day (hPa), minimum AP among the day (hPa). There was no statistically significant association between weather factors and SE (Table 3). To see more detailed association between weather factors and SE, we did further analysis according to the seasons (Table 4). There were statistically significance average AP, minimum AP in autumn and difference AP in summer. And the other weather factors were not significance between present SE and no SE group as ever.

Fig. 2. Number of patients and outcomes of pediatric status epilepticus according to age.

Fig. 1. Number of patients according to in-time of emergency room and month.

Discussion

The conceptual definition of SE was defined by the ILAE as 30 minutes of continuous seizure activity, or a series of epileptic seizures lasting longer than 30 minutes during which function is not regained between ictal events²⁾. This definition was based on animal studies demonstrating acute changes in hippocampal neurons after 30 to 90 minutes of chemically-induced seizure activity and prolonged seizures leading to brain injury in paralyzed and mechanically-ventilated baboons^{1,4,5)}. However, this definition was problematic for clinicians, who aim to aggressively treat SE earlier before any neuronal injury might occur.

Approaches for SE management were proposed in the 2012 Neurocritical Care Society's Guidelines on minutes of continuous clinical or electrographic seizure activity, which establishes the goal of achieving definitive control of SE within 60 min of onset¹⁵⁾. In 2016, the American Epilepsy Society's Guideline for SE management outlined a five minute definition of seizure duration without subdividing based on seizure type²⁾.

The incidence of pediatric SE varies worldwide because of

distinct environments, socioeconomic conditions, and genetic susceptibility to acute neurological disorders. However, the incidence of SE has generally been estimated from 18 to 23 per 100,000 children per year, and the mortality rate has been reported to vary from 2% to 8.3%^{3,5)}. Additionally, convulsive pediatric SE that is accompanied by tonic, clonic, tonic-clonic, or myoclonic movements is estimated to occur from 10 to 23 episodes per 100,000 per year in western countries¹⁷⁾. It is associated with significant mortality (2.7–5.2%) and morbidity (>15%), with neurological sequelae including neurologic deficits, cognitive impairment, and behavioral problems^{2,18,19)}. In 2015, the mortality and morbidity rates of pediatric SE in Japan were reported as 1.0% (2 hospital deaths/201 children) and 7.0% (14 neurologic sequelae/201 children), respectively¹⁰⁾. In Korea, the mortality rate of pediatric SE has been reported to be between 0.1% and 6.4%, but the rate of neurologic sequelae after pediatric SE varied from 5.6% to 32.3% in two reports⁶⁻⁸⁾. Our study revealed a 4.9% mortality rate and a 3.7% morbidity rate. We estimated that the annual incidence of pediatric SE in Changwon City was at least 2.9 per 100,000 children per year. The evidence for this estimation is as

Table 2. Comparisons of Etiology, Duration of Seizure and Clinical Outcomes among the Different Age Groups

	Total			<24 months			24-84 months			≥ 85 months			P-value
	N (n=81)	NS (n=3)	Death (n=4)	N (n=25)	NS (n=1)	Death (n=1)	N (n=34)	NS (n=1)	Death (n=2)	N (n=22)	NS (n=1)	Death (n=1)	
Etiology													0.001
AS	3 (3.7)	2 (66.7)	-	-	-	-	1 (2.9)	1 (100.0)	-	2 (9.1)	1 (100.0)	-	
RS	9 (11.1)	-	1 (25.0)	1 (4.0)	-	1 (100.0)	4 (11.7)	-	-	4 (18.2)	-	-	
IS	31 (38.3)	1 (33.3)	-	8 (32.0)	1 (100.0)	-	9 (26.5)	-	-	14 (63.6)	-	-	
FS	38 (46.9)	-	3 (75.0)	16 (64.0)	-	-	20 (58.9)	-	2 (100.0)	2 (9.1)	-	1 (100.0)	
Duration (hours)													>0.999
<1	33 (40.7)	-	-	11 (44.0)	-	-	15 (44.1)	-	-	7 (31.8)	-	-	
1-2	31 (38.3)	3 (100.0)	2 (50.0)	11 (44.0)	1 (100.0)	1 (100.0)	13 (38.2)	1 (100.0)	1 (50.0)	7 (31.8)	1 (100.0)	-	
2-6	16 (19.8)	-	2 (50.0)	3 (12.0)	-	-	6 (17.7)	-	1 (50.0)	7 (31.8)	-	1 (100.0)	
≥6	1 (1.2)	-	-	-	-	-	-	-	-	1 (4.6)	-	-	

N, Number of patients; NS, neurologic sequelae; AS, acute symptomatic; RS, remote symptomatic; IS, Idiopathic seizure; FS, Febrile seizure.

Table 3. Association Between Weather Factors and Pediatric Status Epilepticus During the Study Period

	Total (4,199 days)	Present SE (79 days)	No SE (4,120 days)	P-value
Rain or Snow				0.509
No	2,855 (68.0)	51 (64.6)	2804 (68.1)	
Yes	1,344 (32.0)	28 (35.4)	1316 (31.9)	
Mean temp. (°C)	15.7 (-9.5-30.7)	16.5 (-2.9-28.7)	15.6 (-9.5-30.7)	0.940
Max. temp. (°C)	20.4 (-6.5-37.1)	21.0 (0.9-33.1)	20.4 (-6.5-37.1)	0.879
Min. temp. (°C)	11.4 (-13.1-28.0)	12.3 (-6.2-26.2)	11.4 (-13.1-28.0)	0.861
DTR (°C)	8.5 (1.2-18.3)	7.5 (2.0-14.4)	8.5 (1.2-18.3)	0.062
Humidity (%)	63.8 (14.4-95.6)	63.6 (24.3-92.1)	68.3 (14.4-95.6)	0.668
Average AP (hPa)	1,015.9 (993.3-1,034.9)	1,014.3 (1,000.4-1,029.7)	1,015.9 (993.3-1,034.9)	0.208
Diff. AP (hPa)	0.0 (-18.7-16.4)	0.4 (-8.2-9.9)	0.0 (-18.7-16.4)	0.262
Max. AP (hPa)	1,018.2 (996.4-1,036.9)	1,016.6 (1,001.5-1,032.7)	1,018.3 (996.4-1,036.9)	0.225
Min. AP (hPa)	1,013.6 (981.5-1,033.7)	1,012.7 (998.4-1,027.6)	1,013.7 (981.5-1,033.7)	0.232

SE, status epilepticus; temp., temperature; Max., maximum; Min., minimum temperature; DTR, diurnal temperature range; AP, atmospheric pressure; Diff., difference

Table 4. Association Between Weather Factors and Pediatric Status Epilepticus According to Seasons

	Total	Present SE	No SE	P-value
Mean temp. (°C)				
Spring	13.8 (-0.3-24.5)	12.6 (2.0-20.8)	13.8 (-0.3-24.5)	0.304
Summer	24.3 (16.2-30.7)	24.0 (17.3-28.7)	24.3 (16.2-30.7)	0.973
Autumn	17.8 (1.7-28.1)	19.4 (8.4-26.3)	17.8 (1.7-28.1)	0.313
Winter	3.5 (-9.5-16.5)	3.4 (-2.9-10.7)	3.5 (-9.5-16.5)	0.947
Max. temp. (°C)				
Spring	19.0 (4.5-33.6)	16.9 (6.9-27.9)	19.0 (4.5-33.6)	0.277
Summer	28.3 (18.8-37.1)	29.1 (20.3-33.1)	28.3 (18.8-37.1)	0.890
Autumn	22.5 (5.2-33.7)	23.0 (11.5-29.2)	22.5 (5.2-33.7)	0.470
Winter	7.9 (-6.5-18.8)	7.2 (0.9-16.5)	7.9 (-6.5-18.8)	0.629
Min. temp. (°C)				
Spring	9.7 (-5.8-20.0)	9.2 (-3.2-15.7)	9.7 (-5.8-20.0)	0.311
Summer	21.4 (10.9-28.0)	21.3 (14.9-26.2)	21.4 (10.9-28.0)	0.763
Autumn	14.0 (-2.3-25.6)	16.3 (5.9-22.2)	14.0 (-2.3-25.6)	0.319
Winter	-0.5 (-13.1-14.6)	-0.3 (-6.2-5.5)	-0.5 (-13.1-14.6)	0.812
DTR (°C)				
Spring	10.0 (1.5-18.3)	10.4 (4.1-14.2)	10.0 (1.5-18.3)	0.938
Summer	7.0 (1.5-13.8)	6.1 (2.0-13.8)	7.0 (1.5-13.7)	0.258
Autumn	8.6 (1.7-14.1)	7.6 (4.4-10.8)	8.6 (1.7-14.1)	0.303
Winter	8.4 (1.2-16.1)	8.2 (2.5-14.4)	8.4 (1.2-16.1)	0.542
Average AP (hPa)				
Spring	1015.1 (995.3-1,034.3)	1015.7 (1,003.2-1,025.3)	1015.1 (995.3-1034.3)	0.804
Summer	1008.0 (994.2-1,019.3)	1008.3 (1,000.4-1,013.7)	1008.0 (994.2-1019.3)	0.815
Autumn	1017.7 (993.3-1,031.8)	1014.3 (1,001.4-1,027.9)	1017.7 (993.3-1031.8)	0.027
Winter	1022.9 (1001.1-1,034.9)	1022.3 (1,013.5-1,029.7)	1022.9 (1001.1-1034.9)	0.862
Diff. AP (hPa)				
Spring	0.0 (-17.1-15.6)	0.7 (-3.2-9.9)	0.0 (-17.1-15.6)	0.407
Summer	0.0 (-12.7-11.3)	1.1 (-5.5-7.3)	-0.1 (-12.7-11.3)	0.024
Autumn	0.1 (-18.7-16.4)	0.1 (-3.0-6.0)	0.1 (-18.7-16.4)	0.688
Winter	0.0 (-13.1-12.8)	-0.1 (-8.2-5.9)	0.0 (-13.1-12.8)	0.359
Max. AP (hPa)				
Spring	1017.6 (997.8-1,035.3)	1,017.8 (1006.7-1,027.0)	1,017.6 (997.8-1,035.3)	0.918
Summer	1009.5 (996.4-1,020.5)	1,009.4 (1001.5-1,014.4)	1,009.5 (996.4-1,020.5)	0.852
Autumn	1019.8 (1001.9-1,034.0)	1,017.7 (1002.9-1,029.9)	1,019.8 (1,001.9-1,034.0)	0.053
Winter	1025.4 (1007.7-1,036.9)	1,025.3 (1016.4-1,032.7)	1,025.4 (1,007.7-1,036.9)	0.959
Min. AP (hPa)				
Spring	1012.6 (991.8-1,033.0)	1,013.9 (998.4-1,023.2)	1,012.6 (991.8-1,033.0)	0.743
Summer	1006.6 (992.0-1,018.3)	1,007.0 (999.7-1,012.8)	1,006.6 (992.0-1,018.3)	0.947
Autumn	1015.5 (981.5-1,030.5)	1,013.4 (999.7-1,026.5)	1,015.6 (981.5-1,030.5)	0.019
Winter	1020.7 (997.1-1,033.7)	1,019.4 (1,009.9-1,027.6)	1,020.7 (997.1-1,033.7)	0.774

SE, status epilepticus; Mean temp., mean temperature; Max temp., maximum temperature; Min temp., minimum temperature; DTR, diurnal temperature range; AP, atmospheric pressure; diff., difference; Max., maximum; Min., minimum.

follows. Our pediatric emergency room is in the largest hospital in Changwon City. The average pediatric (<19 years old) and total annual population of Changwon City for the past 11.5 years has been 262,083 and 1,083,858, respectively. The pediatric SE during this period was at least 81 patients.

Several early predictors of poor outcomes in pediatric SE patients have been reported previously. Lambrechtsen et al. reported that predictors of poor outcome include intractable seizure that failed with a second anticonvulsive drug, age <5 years, long

seizure duration, and acute symptomatic etiology⁴⁾. Similarly, Maegaki Y et al. reported that young age and seizure intractability are highly predictive of poor outcomes in pediatric SE patients. Additionally, abnormal blood glucose levels and elevated aspartate aminotransferase (AST) and C-reactive protein (CRP) levels were predictors that might be closely associated with etiology, especially acute encephalopathy and severe bacterial infection²⁰⁾. Our study found no statistically significant association between mortality and several factors investigated, including age, long

seizure duration, and acute symptomatic etiology among the different age groups. However, we found that febrile etiology, a generalized seizure type, and seizure duration within 1 hour were more common in the study population. We also observed that mortality (2 of the 4 patients that died) and morbidity (3 of the 3 new neurologic sequelae patients) was highest in patients with seizures lasting 1 to 2 hours.

Several previous studies have reported on the association between seizure frequency and the weather. Altimiras-Roset J et al. reported that 87.2% of epileptic seizures occur during the daytime and 36.3% occur in the morning between 08:00 and 10:59. However, they found no statistically significant relationship between the presence of epileptic seizures and phases of the moon or days of the week, nor between the number of epileptic seizures and the AP, rainfall, degree of humidity or mean temperature²¹⁾. Doherty et al. reported that among patients with proven epilepsy, an increase of seizure frequency was recorded during changes of AP, particularly if the change was greater than 5.5 hPa per day by telemetric video-electroencephalography (EEG) recording in 159 seizure of 96 epilepsy patient's record. They also found no statistically significant association between daily mean, maximum, or minimum pressure and seizure frequency¹¹⁾. Ruegg et al. revealed that an analysis of 184 SE cases showed significant circadian rhythm of intensive care unit admissions, with the maximum between 17:00 and 19:00 and with the minimum in the early morning. The frequency of SE increased in sunny days and with longer insolation. But, higher air humidity, high temperature and cloudy days were protective factors. The risk of non-convulsive SE was higher in summer¹⁰⁾. Some studies indicated that tonic-clonic and partial seizures occurred significantly more frequently in summer months and the number of seizures was greater with lower atmospheric pressure and higher DTR. While other report noted that epileptic seizures in children were significantly more frequent in spring and autumn⁹⁾.

There were several mechanisms hypotheses about why weather influences the frequent of seizure. First, seasonal rhythm of seizure activity may be associated with the seasonal rhythm of melatonin excretion which is associated with changes of the insolation in different seasons. Danesi reported that epileptiform discharges in EEG were noted more frequently in winter, and they became more severe in unstable weather conditions²²⁾. Second, it was well noted that some patients develop seizures after hyperventilation (HV). With a decrease in air pressure, the partial pressure of oxygen also decreases cause a subtle increase in HV, and may result in neurological events including seizure²³⁾. Third, CO₂ responsivity might increase seizure susceptibility. End-tidal CO₂ response in patients with vagus nerve stimulators

may demonstrate brief intermittent episodes of hypocapnia²⁴⁾. Other studies suggest CO₂ related subtle changes in acid-base regulation may act as potential mechanism of seizure control or seizure cessation^{25,26)}.

In this study, we found the association between AP affected and pediatric SE especially in autumn. Average AP and minimum AP on present SE day were significantly lower than no SE day.

Our study has several limitations. First, this study may not be generalized because it was performed at the single hospital of Changwon City in Korea where the underlying cause of SE may be different than in other regions. Second, the rates of morbidity may be inaccurate because we could not investigate long-term sequelae, such as intellectual impairment, delayed speech, or learning disabilities.

In conclusion, our study showed that the most pediatric SE patients visiting the ER were febrile generalized convulsive type in 2-6 years old patients. Additionally there was a high rate of refractory SE (59.3%) and a lower rate of new neurologic sequelae (3.7%) than previously reported. Average AP and minimum AP on present SE day were significantly lower than no SE day. However, there were no significant difference between SE and other weather factors such as daily mean temperature, maximum temperature, minimum temperature, DTR, rain or snow, and degree of humidity. Further study using a larger number of patients may be necessary to clarify the association between SE and weather factors.

Acknowledgments

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요약

목적: 응급실로 내원하는 소아청소년 뇌전증지속증(Status epilepticus)환자들의 임상적 특징과 임상 결과를 조사하고, 아울러 이 환자들이 응급실로 내원하는 빈도와 날씨와의 연관성이 있는지를 확인하고자 한다.

방법: 2005년 1월부터 2016년 6월까지 삼성창원병원 응급실로 내원한 뇌전증지속증환자 중 만 19세 미만의 소아청소년 환자 81명을 대상으로 의무기록지를 통해 후향적으로 조사하였다. 소아청소년 뇌전증지속증 환자의 원인, 발작 지속 기간, 발작 형태, 사용한 항뇌전증 약물 수 및 임상 결과를 분석하였다. 연령에 따른 그룹에서 임상적인 특징이 차이가 나는지 Kruskal-Wallis 검정을 이용하여 비교하고 날씨와 뇌전증지속증 환자의 응급실 방문과 연관성이 있는지에 대해

Chi-square 검정과 Mann-Whitney *U* 검정을 이용하여 통계적으로 분석하였다.

결과: 창원시의 19세 미만 소아청소년 뇌전증지속증 환자의 10만명당 연간 발생률은 최소 2.9명으로 추정되었다. 81명의 환자 중 48명 (59.3%)은 난치성 간질지속증 환자였다. 7세 이하에서는 열성 뇌전증 지속증이 가장 흔한 원인이었고, 7세 이상에서는 특발성 뇌전증지속증이 가장 흔한 원인이었다. 전신형 발작(88.9%)이 가장 흔한 발작 형태였고, 사망률은 4.9%, 신경학적 후유증이 새로 생긴 경우는 3.7%였다. 날씨와 간질지속증의 연관성 분석 결과, 가을에 뇌전증지속증으로 환자가 내원한 날이 그렇지 않은 날에 비해 기압이 낮게 나타났으며 이는 통계적으로 유의하였다.

결론: 소아청소년 뇌전증지속증 환자는 2-6세군에서 전신형 발작 형태가 가장 많았으며, 이전에 알려진 연구와 비교할 때 난치성 뇌전증 지속증은 높은 비율을 보였고, 새로 생긴 신경학적 후유증의 발생률은 낮았다. 또한, 날씨 중에서도 기압의 영향을 받는 것으로 확인하였다.

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