CLINICAL FEATURES OF EPILEPSY PATIENTS WITH OBSTRUCTIVE SLEEP APNEA HYPOPNEA SYNDROM

JIHONG HAN[1], SHUAI SHI[2], JIAJUN XU[1], FANGFANG BI[1], YANHUI PENG[1**]
[1]Department of Neurology, Sixth Affiliated Hopspital of Xinjiang Medical University, Urumqi City 830002, China - [2]Department of Rrespiratory, Sixth Affiliated Hopspital of Xinjiang Medical University, Urumqi City 830002, China

ABSTRACT

Objective*: This paper attempts to study and analyze the clinical features of epilepsy patients with obstructive sleep apnea hypopnea syndrom (OSAHS).*

Method*: This paper selects 68 partial epilepsy patients treated at the Outpatient Department and the Inpatient Department of the Second Affiliated Hospital of Nanchang University from October 2015 to December 2016 as the subjects and divides them into the epilepsy with OSAHS group (21 cases) and the epilepsy without OSAHS group (47 cases). By comparing the types of antiepileptic drugs the two groups used and their interictalepileptiform discharges (IEDs), this paper analyzes the clinical features of partial epilepsy patients with OSAHS.*

Result*: Through comparison of the epilepsy with OSAHS group and the epilepsy without OSAHS group, it is found that there are statistically significant differences in age, gender, age of onset and IEDs (P<0.05). Age of onset and IED have positive effects on AHI, i.e. the older the age of onset is and the higher the positive rate of IED is, the higher the AHI will be.*

Conclusion*: In this study, the incidence rate of epilepsy with OSAHS is 30.88%, and the main clinical features include middle-aged and elderly male, great age of onset and high positive rate of IED.*

Keywords*: Epilepsy, OSAHS, Clinical featuresblood supply.*

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Introduction

Epilepsy and sleep apnea syndrome (SAS) are both high-incidence chronic diseases. Epilepsy is a group of syndromes characterized by episodic, transient, repetitive and often stereotypic CNS dysfunctions caused by abnormal electrical discharges with highly synchronized brain neurons that are often self-limiting resulting from various reasons. SAS is a common chronic sleep respiratory disorder, including obstructive sleep apnea hypopnea syndrom (OSAHS), central sleep apnea syndrome and sleep hypoventilation syndrome. Clinically, OSAHS is the most common one[(1)]. It is characterized by snoring with sleep apnea and shallow breathing, repeated complete and incomplete obstruction of the upper airway during sleep, accompanied by intermittent hypoxemia or hypercapnia and disordered sleep structure. Its hazards to people's health are its high prevalence and its effects on multiple systems and multiple organs of the human body.

Despite the rational and effective use of antiepilepsy drugs (AEDs), 36% of the epilepsy patients have poor control of epilepsy. This kind of epilepsy is classified as medically intractable epilepsy. They often complained about daytime sleepiness, drowsiness, poor attention and memory deterioration, seriously affecting their quality of life, but clinicians cannot simply attribute these symptoms to epilepsy seizures or adverse effects of anti-epilepsy drugs and should be alert of whether there is any sleep disorder. Malow et al. studied 39 intractable epilepsy patients and found that OSAHS is common among them.

Sleep apnea may facilitate interictal epileptiform discharges (IEDs)[(2)]. This also suggests that

sleep apnea may be one of the reasons that epilepsy is refractory.

At present, the correlation between epilepsy and SAS is attracting increasing attention from people. Although patients' sleep is affected by many reasons, SAS also plays some role in it[3]. Polysomnography (PSG) is the gold standard for diagnosing SAS. Through polysomnography (PSG) monitoring on epipilepsy patients, researchers can quantitatively study the distribution of epileptic discharge during sleep and evaluate the abnormality of sleep structure, find out the correlation between epileptic discharge and sleep apnea and explore the nature of its occurrence and development so as to provide a basis for clinical practice (the clinical detection of polysomnography is shown in Figure 1 below).

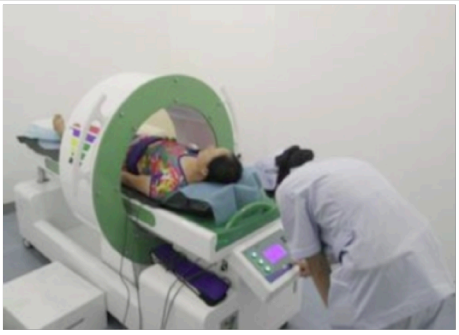

Figure 1: Clinical detection of polysomnography.

According to relevant reports abroad, sleep apnea has a higher incidence in epilepsy patients and SAS can aggravate the attacks of epilepsy. By observing PSG monitoring indices, some scholars found that there is no significant difference in the sleep structures of epilepsy patients with SAS, and that there are significant differences in terms of apnea and hypopnea index (AHI) and oxyhaemoglobin saturation (SpO_2). They also found that, through CPAP treatment, epilepsy patients with OSAHS have much lower frequencies of epilepsy seizures. From this, it can be seen that studying the impacts of sleep apnea on epilepsy has a profound clinical significance - it can not only provide a basis for clinical diagnosis, but also give further guidance to clinical treatment, thereby improving the quality of life of epilepsy patients[4,5]. So far there is hardly any report on the impacts of sleep apnea on epilepsy in China. Therefore, in this study, the author collected a group of epilepsy patients, observed the relationship between epilepsy and OSAHS, the incidence of OSAHS in epilepsy patients and its clinical features and discussed its impacts on epilepsy, with a view to providing basis for the clinical control of epilepsy attacks and improving the quality of life of epilepsy patients.

Methods

Subjects

The author selected 68 partial epilepsy patients treated at the Outpatient Department and the Inpatient Department of the Second Affiliated Hospital of Nanchang University from October 2015 to December 2016 as the subjects and performed PSG and synchronous VEEG monitoring on them. According to the PSG monitoring results, the author determined whether the patients have OSAHS, and divided them into the epilepsy with OSAHS group (21 cases) and the epilepsy without OSAHS group (47 cases).

Research methods

The basic conditions and medical history of the subjects were collected, and medical examinations were conducted by special personnel. According to the PSG monitoring results, partial epilepsy patients were divided into epilepsy with OSAHS group (21 patients) and the epilepsy without OSAHS group (47 patients). Then the author calculated the incidence of partial epilepsy patients with OSAHS, compared whether or not the sleep-breathing parameters were statistically significantly different between the two groups, and at the same time analyzed the clinical features of epilepsy patients with OSAHS. All-night PSG is the gold standard for diagnosing OSAHS, including electroencephalograms (F3-A2, C3-A2, O1-A2, F4-A1, C4-A1, O2-A1, mastoid A1 and A2 as reference electrodes), two-lead electrocardiogram (EOG), mandibular electromyography (EMG), mouth and nasal respiratory airflow and thoracoabdominal breathing exercises, snoring, arterial oxygen saturation, electrocardiogram, posture and leg movement events[6].

The subjects were asked to maintain a regular schedule, adjust their sleep cycles and avoid staying up late in the week before the examination. The entire installation process was carried out by specially trained personnel. The objective was to monitor the patients' sleep for no less than 7 hours a night. In order to ensure the interpretation accuracy of sleep stages and respiratory events, a specialized sleep specialist was engaged in this study to diagnoses OSAHS.

The subjects used the international 10-20 system for scalp EEG recording, according to the principles of symmetry and equal spacing: FPz (frontal midline), Cz (central midline), Pz (top midline), FP1 (left frontal pole), FP2 (right frontal pole), F3 (left frontal), F4 (right frontal), F7 (left anterior temporal), F8 (right anterior temporal), T3 (left mid-temporal), T4 (right mid-temporal), C3 (left central), C4 (right centra), T5 (left posterior temporal), T6 (right posterior temporal), P3 (left parietal), P4 (right parietal), O1 (left occipital) and O2 (right occipital). IEDs had the characteristics of negative phase spike waves or sharp waves. Most spike or sharp waves were followed by a diffuse wave to form a spike and slow wave complex or sharp and slow wave complex. Epileptic discharges often form a certain field potential, centred around the point with the highest amplitude and affecting the surrounding range[7].

Statistical methods

The author used the SPSS19.0 statistical analysis software to perform statistical analysis of the data and conducted normal distribution test on all measurement data (Kolmogorov-Smirnov test). Measurement data are expressed as mean±standard deviation (x±s). If the measurement data are normally distributed, independent sample t test is used for comparison; if the measurement data are non-normally distributed, the nonparametric test is used. Enumeration data are subject to chi-square test. The difference is statistically significant if P<0.05. The multivariate stepwise linear regression is used to analyse factors affecting AHI.

Results Analysis

Comparison of the sleep breathing parameters between patients with different degrees of OSAHS in the epilepsy with OSAHS group

Among the 68 partial epilepsy patients, 21 met the diagnostic criteria of OSAHS (30.88%), including 13 mild ones (61.9%), 6 moderate ones (28.6%) and severe ones (9.5%). There are 15 male (71.4%) and 6 female (28.6%). The detailed sleep breathing parameters of the 21 patients are listed in Table 1.

Comparison of the oxyhemoglobin saturation between the epilepsy with OSAHS group and the epilepsy without OSAHS group

The differences between the epilepsy with OSAHS group and the epilepsy without OSAHS group in terms of the average oxyhemoglobin saturation and the minimum oxyhemoglobin saturation are statistically significant (P<0.05)(8,9). Details are listed in Table 2.

	OSAHS (n = 21)	Mild OSAHS (n=13)	Moderate OSAHS (n=6)	Severe OSAHS (n=2)
Apnea number	85.10±81.89	35.62±24.01	144.33±49.20	229.00±144.25
Low ventilation event	37.38±31.28	29.54±18.65	31.83±29.33	105.00±31.11
AHI	18.43±13.89	10.15±2.63	25.73±9.95	50.33±6.02
Average oxygen saturation	96.10±2.02	96.46±1.27	94.67±2.88	98.00±0.00
Minimum oxygen saturation	81.48±5.63	84.62±3.06	77.50±5.51	73.00±2.82

Table 1: Comparison of sleep breathing parameters in the epilepsy with OSAHS group.

	Epilepsy combined with OSAHS group	Epilepsy was not combined with OSAHS group	P values
Average oxygen saturation	97.00 (95.50～97.00)	97.00 (96.00～98.00)	0.023
Minimum oxygen saturation	82.00 (80.00～85.00)	89.00 (85.00～91.00)	P<0.001

Table 2: Comparison of sleep breathing parameters.

Clinical features and drug treatment of the partial epilepsy patients

This study included 68 partial epilepsy patients, among which, there were 37 patients mainly suffering from nocturnal seizure and 27 with a seizure frequency of more than once every month in the last 6 months. There were 2 patients without any drug treatment and 66 with drug treatment, including 40 under monotherapy, and 26 under multi-drug treatment(10). The specific clinical features and information on drug treatment are listed in Table 3.

	NO.	%
The night attack	37	54.41
Frequency of onset in the last six months: > attacks once a month	27	39.71
treatment		
No medication was taken	2	2.94
medicate	66	97.06
monotherapy	40	58.82
Multi-drug treatment	26	38.24

Table 3: Clinical features and treatment status.

Comparison of the clinical features between the epilepsy with OSAHS group and the epilepsy without OSAHS group

Between the epilepsy with OSAHS group and the epilepsy without OSAHS group, there are statis-

tically significant differences in age, gender, age of onset and IEDs (P<0.05), and no such differences in BMI, disease duration, nocturnal seizure, seizure frequency in the last 6 months and types of antiepileptic drugs (P>0.05)(11-13). Details are listed in Table 4.

	Epilepsy combined with OSAHS group	Epilepsy was not combined with OSAHS group	P values
age	51.43±15.15	39.26±14.54	0.002
gender			
male	15 (71.4%)	19 (40.4%)	0.018
female	6 (28.6%)	28 (59.6%)	
Body mass index (bmi)	22.14±2.43	21.37±2.67	0.263
The onset age	47.10±15.22	32.47±13.90	P<0.001
The course of time	3.00 (1.00~5.00)	6.00 (2.00~10.00)	0.066
The night attack	12 (57.1%)	25 (53.2%)	0.762
Frequency of onset in the last six months: > attacks once a month	7 (33.3%)	20 (42.6%)	0.473
treatment			
No medication was taken	1 (4.8%)	1 (2.1%)	0.695
medicate	20 (95.2%)	46 (97.9%)	
monotherapy	11 (52.4%)	29 (61.7%)	
Multi-drug treatment	9 (42.8%)	17 (36.2%)	
IEDs	12 (57.1%)	14 (29.7%)	0.032

Table 4: Comparison of clinical features.

Multivariate stepwise linear regression analysis of the influencing factors to AHI

With AHI as the dependent variable and factors related to AHI as the independent variables, the author performed the multivariate stepwise linear regression analysis and used the backward regression method - eliminating the variable with the largest P value until the significance levels of all variables are less than 0.10. It is found that age of onset and IED have positive effects on AHI, i.e. the older the age of onset is and the higher the positive rate of IED is, the higher the AHI will be[14,15]. For details, see Table 5.

The dependent variable	The independent variables	B value	SE	beta	T value	P values
AHI	The onset age	0.164	0.083	0.232	1.981	0.052
	IEDs	5.68	2.657	0.25	2.138	0.036

Table 5: Multivariate stepwise linear regression analysis of AHI.

Conclusion

The co-existence of epilepsy and OSAHS is often overlooked. When epilepsy patients experience daytime sleepiness or memory deterioration, and the conventional drug treatment is not quite effective, these patients, especially the middle-aged and elderly male ones with great age of onset, should be alert to OSAHS diagnosis. We can use ESS, SA-SDQ or Berlin questionnaire for screening and conduct PSG monitoring on suspected OSAHS patients to evaluate the severity of their illnesses. Early diagnosis of OSAHS is conducive to controlling epilepsy seizures and improving the patients' living quality. In this study, the incidence rate of epilepsy with OSAHS is 30.88%, and the main clinical features of the partial epilepsy patients with OSAHS include middle-aged and elderly male, great age of onset and high positive rate of IED.

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Corresponding author
YANHUI PENG
Department of Neurology, Sixth Affiliated Hopspital of Xinjiang Medical University, Urumqi City 830002
China
E-mail: yanhui_peng513@163.com
(China)