Research of Sleep Disorders in Patients with Acute Cerebral Infarction

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Background: The purpose of this study is to investigate the incidence of sleep disorders (SD), characteristic of cerebral infarction patients with different parts affected. *Methods:* The research selected 101 patients with a first occurrence of acute cerebral infarction as the experimental group, and 86 patients without cerebral infarction as controls. Polysomnography, Pittsburgh Sleep Quality Index, Epworth Sleepiness Scale, and US National Stroke Scale were assessed. *Results:* Compared with control group, the incidence of SD was higher in experimental group ($P < .05$), and the incidence of SD in women was more frequent in experimental group ($P < .05$). There was no significant difference in the types of SD patients with acute cerebral infarction. In addition, the sleep quality of cerebral infarction patients with different parts affected was different: the sleep quality of left hemisphere infarction patients was poor compared with the right one, and the sleep quality of anterior circulation patients was poor compared with posterior circulation patients. Patients with thalamus infarction had a longer sleep time and a shorter sleep latency and stage 2 of non–rapid eye movement sleep compared with non–thalamus infarction group. *Conclusions:* The prevalence of SD was relatively high in acute cerebral infarction patients, and the detailed classification of acute cerebral infarction may provide a more effective therapeutic method and therefore relieve patients' pain and supply a better quality of sleep. **Key Words:** Acute cerebral infarction—sleep disorders—sleep quality—excessive daytime sleep.

Acute cerebral infarction is a major cause of disability and the second leading cause of death; there is still no effective method to reduce acute cerebral infarction mortality.[1] Sleep disorders (SD) of acute cerebral infarction are related to many risk factors leading to acute cerebral infarction, and SD may be exacerbated by acute cerebral infarction or caused by acute cerebral infarction.[2] Some reports showed that SD is one serious complication in acute cerebral infarction patients, which is characterized by insomnia, hypersomnia, sleep-disordered breathing, excessive daytime sleep (EDS) and depression, restless legs syndrome, or anxiety.[3-6] Some reports showed that SD can not only affect the cognitive function, life quality, physical and mental health, and recovery of patients' physiological functions, but also aggravate the risk of acute cerebral infarction, and at worst, induce the recurrence of acute cerebral infarction.[7] At present, the relationship between SD and cerebral infarction has

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been well described, but still not fully understood. Limited data are available in related research of the detailed classification in patients with both SD and acute cerebral infarction. In addition, unrecognized and untreated SD may influence the rehabilitation and function following acute cerebral infarction and increase the risk of acute cerebral infarction recurrence. Therefore, this study provides a detailed classification of acute cerebral infarction to clarify the characteristics of different types of patients with acute cerebral infarction, and consequently to provide clinical evidence or a method for further relieving and treating patients' symptoms to improve the quality of their life.

Materials and Methods

Patients

The experimental group included 101 patients (65 men and 36 women with a mean ± standard deviation age of 56.67 ± 12.4 years) with acute cerebral infarction, who were recruited from the Department of Neurology, Tianjin Union Medicine Centre, from July 1, 2010, to December 31, 2011. Normal controls consisted of 86 patients (50 men and 36 women aged 64.69 ± 11.67 years) without cerebral infarction, who were recruited from the physical examination center of our hospital. There was no significant difference between the 2 groups in terms of age ($P > .05$).

The diagnostic criteria should meet the revised standards of the Fourth National Cerebrovascular Disease Conference in 1995: aged 40-80 years, and the course of disease was within 2 weeks, diagnosed by brain magnetic resonance imaging scan. Patients were excluded from the study if they meet any of the following criteria: (1) with serious condition who cannot cooperate with the inspection; (2) with mental disorder or family history; (3) with severe sleeping disorder; (4) with drug and alcohol abuse; (5) with cerebral infarction combined with other serious physical diseases; and (6) with dementia. Informed consent was obtained from all patients. The study was approved by the Ethics Committee of Tianjin Union Medicine Centre. Face-to-face questionnaires were carried out by 2 professional neurology specialists.

Methods

The National Institutes of Health Stroke Scale (NIHSS) was used to assess patients' neurologic function. The psychological symptoms such as depression and anxiety were evaluated using the Hamilton depression and the Hamilton anxiety rating scores, respectively. Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS) were applied to assess the quality of sleep and excessive daytime sleepiness, respectively. The whole process of objective sleep examination was monitored with EmblaN7000 (Embla, Broomfield, CO) under 20°C for at least 8 hours. Significant difference was indicated by P less than .05.

Table 1. *The incidence of SD*

Groups	SD (%)	Non-SD (%)	Total
Experimental group	78 (77.23%)	23 (22.77%)	101
Control group	24 (27.91%)	62 (72.09%)	86

Abbreviation: SD, sleep disorders.
Statistical significance was set at $P = .00$.

Statistical Analysis

All measurement data were analyzed by SAS 9.3 statistical software (SAS Institute Inc., Cary, NC). Qualitative data of both the groups were compared by $\chi 2$ test. Researchers used the unpaired t test for quantitative data. Statistical significance was set at P less than .05.

Results

Incidence of Sleep Disorders

The results of Table 1 showed that SD were found in 78 (77.23%) of 101 patients with acute cerebral infarction and 24 (27.91%) of 86 controls. There was a significant difference between the 2 groups. In the 101 patients with acute cerebral infarction, significant differences were found between SD group and non–SD group in National Institutes of Health Stroke Scale, Hamilton depression, and Hamilton anxiety scores (Table 2). Our results suggested that cerebral infarction patients with low neurologic function, depression, or anxiety were more tend to have SD.

Incidence of Different Types of Sleep Disorders

As shown in Table 3, the incidence of EDS was 11.9% (12) in experimental group, whereas 1.2% in control group; difficulty falling asleep was 44.6% in experimental group and 18.6% in control group; early awakening was 24.8% in experimental group and 7% in control group; snoring was 9.9% and 3.5%, and nocturia was 15.8% and 7%, respectively, in experimental and control groups. The results demonstrated that there was no distinct difference between the 2 groups ($P > .05$).

Table 2. *Difference in NIHSS, HAMD, and HAMA scores in patients with acute cerebral infarction*

Parameters	SD (n = 78)	Non-SD (n = 23)
NIHSS	7.93±2.28	4.01±2.63*
HAMD	31.55±5.64	5.9±3.2*
HAMA	19.49±4.46	5.4±4.55*

Abbreviations: HAMA, Hamilton anxiety; HAMD, Hamilton depression; NIHSS, National Institutes of Health Stroke Scale; SD, sleep disorders.
*Represents $P < .05$ compared with the SD group.