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CLINICAL RESEAPCH

Effect of Brain Biofeedback Therapy on the Improvement of Adverse Mood and Quality of Life in Patients with Mixed Anxiety and Depression Disturbance

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Keywords

Brain biofeedback, Mixed anxiety and depression, Quality of Life, Adverse mood

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Abstract

Objective To explore the effect of brain biofeedback therapy on the improvement of adverse mood and quality of life in patients with mixed anxiety and depression disturbance. **Methods** Eighty patients with mixed anxiety and depression disturbance treated in our hospital from May 2019 to September 2020 were selected as the research subjects, and they were randomly divided into observation group and control group, with 40 cases in each group. Both groups were treated with paroxetine and observation group was additionally treated with brain biofeedback therapy. The treatment lasted for 6 weeks. The Hamilton Depression Scale (HAMA), the Hamilton Anxiety Scale (HAMD) and the World Health Organization Quality of Life Scale (WHOQOL-100) scores of patients were compared between the two groups before treatment and at 2 weeks, 4 weeks and 6 weeks after treatment. **Results** Before treatment, there were no significant differences in HAMA, HAMD, and WHOQOL-100 scores between the two groups (P>0.05). At 2 weeks, 4 weeks, and 6 weeks after treatment, the HAMA score and HAMD score of the two groups were significantly lower than before treatment (P<0.05), and those in observation group were significantly lower than those in control group (P<0.05). In the WHOQOL-100 score table, after treatment, the scores of physical, psychological, environment and social relationships in the two groups were significantly higher than those before treatment (P<0.05). Among them, in the physical and psychological domains, the scores of observation group were significantly higher than those of control group (P<0.05) while in the domains of environment and social relationships, there was no significant difference between the two groups (P>0.05). **Conclusion** Brain biofeedback therapy had a significant effect on patients with mixed anxiety and depression disturbance, which could significantly improve patients' adverse mood including anxiety and depression and ameliorate their quality of life.

Introduction

Mixed anxiety and depression disturbance is a disease associated with autonomic symptoms, usually accompanied by clinical symptoms such as anxiety, difficulty falling asleep, restlessness, nervousness, irritability and sadness. The disease also brings mental distress to patients andmakes patients prone to lose interest in life and the severe cases even have suicidal tendencies. Currently, antidepressant or anti-anxiety drugs are the major treatment for mixed anxiety and depression disturbance, which are harmful to the body. It has been reported that the active participation of patients in the treatment of anxiety and depression could reduce the resistance to their own diseases and raise their enthusiasm. As a new treatment, brain biofeedback therapy, through training and reinforcing a certain frequency of brain waves of patients, ameliorates brain wave activity and makes patients autonomously control the change of consciousness and fulfill the brain function by self-regulation. Besides, brain biofeedback therapy is pure physical therapy with high safety factor. At present, that therapy has made fruitful achievements in clinical trials, but the effects of the therapy on negative emotions and life quality of patients with mental disorders are few studied. This study intended to explore the influence of brain biofeedback therapy on adverse mood and life quality of patients with mixed anxiety and depression disturbance, trying to provide evidence for clinical investigation. The results were reported as follows.

Materials and methods

Clinical data

Eighty cases with mixed anxiety and depression disturbance treated in our hospital from May 2019 to September 2020 were selected as the research subjects and they were randomly divided into observation group and control group with 40 cases in each group. The clinicopathological features of each case consisting of sex, age and course of disease were collected from patient records. As shown in Table 1, sex, age and course of disease of patients did not differ significantly between the two groups (P>0.05). The research was approved by the Ethics Committee of our Hospital with all patients volunteering to participate in the experiments and the informed consent was acquired.

Table 1 Clinical data between two groups

Group	Case	Sex		Age（year）	Course of disease（year）
		Male	Female		
Control	40	14	26	40.33±5.65	2.56±0.63
Observation	40	13	27	41.75±5.86	2.69±0.72
t/χ^2		0.056		-1.103	-0.859
P		0.813		0.273	0.393

Inclusion and exclusion criteria

Inclusion criteria were: patients meeting the diagnostic criteria of T2DM; 4. patients meeting the diagnostic criteria of mixed anxiety and depression disturbance in *The Diagnostic and Statistical Manual of Mental Disorders*.

Exclusion criteria were: 1. stroke, coronary disease, angina and other severe diseases; 2. a history of drug allergy or pregnant/lactating women and other people not suitable for drug use; 3. severe dysfunction of liver, kidney and other organs.

Method

Control group was treated with paroxetine orally: initial dose was 20mg·d^{-1}, which slowly increased after a week according to patient's condition with a final dose in a range of 20-60mg·d^{-1}. The treatment lasted for 6 weeks.

Based on the treatment of control group, observation group was additionally treated with brain biofeedback

therapy: 1. before treatment, the principle, method and safety of brain biofeedback therapy system were introduced to patients so that the misgivings of patient could be eliminated and implementation of treatment could be furthered; 2. patients sit back in the chair in a quiet environment with the muscle relaxed and the mood steadied; 3. different instructions were given to patients for the corresponding changes to train the α and θ waves in the brain activity of patients; 4. The feedback signals of brain biofeedback system were collected and the data were recorded; 5. after the information was collected, patients were guided to spontaneous activity for relaxation. Observation group was trained three times each week with 20 min for each time. The treatment lasted for 6 weeks.

Outcome measures

The Hamilton Depression Scale (HAMA), the Hamilton Anxiety Scale (HAMD) and the World Health Organization Quality of Life Scale (WHOQOL-100) scores of two groups before treatment and at 2 weeks, 4 weeks and 6 weeks after treatment. HAMA: 0-7 = depressive symptoms basically disappear; 7-14 = depressive symptoms may exist; >14 = obvious depressive symptoms. HAMD: <7 = no obvious anxious symptoms; 7-24 = mild to moderate symptoms of anxiety; >24 = a serious condition. WHOQOL-100 is composed of physical domain (0-60), psychological domain (0-100), domain of environment (0-160) and domain of social relationships (0-60), the higher score of which means a better life quality of patients.

Statistical analysis

Statistical analysis was made through SPSS 20.0 (IBM, Armonk, NY, USA). The enumeration data was presented as frequency and compared through χ^2 test. The measurement data were performed as the means ± standard deviation and repeated measurement ANOVA was adopted for analysis of the difference of each group at multiple time points, as pairwise comparison was made by Bonferroni correction and two groups were contrasted using Student's *t* test. $P<0.05$ was considered to implicate a statistically significant difference.

Results

HAMA score

There was no obvious difference of HAMA scores between two groups before treatment (Table 2, $P>0.05$). After treatment, HAMA scores in two groups appreciably decreased in comparison with those before treatment (Table 2, $P<0.05$) and HAMA score of observation group after treatment was notably lower than that of control group after treatment (Table 2, $P<0.05$).

Table 2 HAMA scores between two group before and after treatment（$\bar{x}$±s，point）

Group	Case	Before treatment	2 weeks after treatment	4 weeks after treatment	6 weeks after treatment	*F*	*P*
Control	40	17.68±5.00	14.65±3.72[a]	11.22±3.05[a]	8.65±2.11[a]	122.279	0.000
Observation	40	17.54±5.98	11.23±3.43[a]	8.02±2.12[a]	5.34±1.97[a]	271.684	0.000
t		0.114	4.275	5.449	7.292		
P		0.910	0.000	0.000	0.000		

Note: compared with before treatment，[a]$P < 0.05$.

HAMD score

No marked difference of HAMD scores was observed between two groups before treatment (Table 3, $P>0.05$) while both group reduced HAMD scores at 2 weeks, 4 weeks and 6 weeks after treatment in contrast with those before treatment (Table 3, $P<0.05$), as the HAMD score in observation group after treatment dramatically lower than that in control group after treatment (Table 3, $P<0.05$).

Table 3 HAMD score between two groups before and after treatment（$\bar{x}$±s，point）

Group	Case	Before treatment	2 weeks after treatment	4 weeks after treatment	6 weeks after treatment	*F*	*P*
Control	40	20.16±6.78	12.76±3.64[a]	10.98±3.06[a]	8.64±2.75[a]	88.009	0.000
Observation	40	20.05±6.12	9.87±3.02[a]	6.87±1.76[a]	4.99±0.95[a]	236.545	0.000
t		0.076	3.865	7.364	7.934		
P		0.939	0.000	0.000	0.000		

Note: compared with before treatment，[a]$P < 0.05$.

WHOQOL-100 score

WHOQOL-100 scores did not differ prominently between two groups before treatment (Table 4, $P>0.05$). After treatment, the scores of four domains including physical domain, psychological domain, domain of environment and domain of social relationships in both groups were significantly higher than those before treatment (Table 4, $P<0.05$). Additionally, patients in observation group obviously declined scores of physical and psychological domains relative to control group (Table 4, $P<0.05$) whereas no prominent difference of scores in domains of environment and social relationships were viewed between two groups after treatment (Table 4, $P>0.05$).

Table 4 WHOQOL-100 score before and after treatment（$\bar{x}$±s，point）

Group	Case	Physical		*t*	*P*	Psychological		*t*	*P*
		Before	After			Before	After		
Control	40	9.64±2.87	11.87±3.98	-2.874	0.005	10.24±3.12	12.15±3.95	-2.400	0.019
Observation	40	9.98±2.65	14.05±3.65	-5.707	0.000	10.98±3.25	14.43±4.03	-4.215	0.000
t		-0.550	-2.884			-1.039	-2.555		
P		0.584	0.005			0.302	0.013		

		Environment		*t*	*P*	Social relationships		*t*	*P*
		Before	After			Before	After		
Control	40	10.73±3.21	12.99±3.94	-2.813	0.006	9.46±2.87	11.22±3.24	-2.572	0.012
Observation	40	10.26±3.05	12.62±3.65	-3.138	0.002	9.79±2.63	11.65±3.54	-2.667	0.009
t		0.668	0.436			-0.536	-0.567		
P		0.506	0.664			0.593	0.573		

Discussion

Mixed anxiety and depression disturbance is one of the most common mixed diseases in psychiatry department, patients with which easily fall into a long-term depression and produce adverse mood like panic and nervousness with a weak self-control; if this continues, it will seriously harm the social function of patients, bring a heavy burden to the family and even lead to suicide of patients. According to the statistics of relevant researches, the lifetime prevalence of mixed anxiety and depression disturbance is about 12.8% and patients need to receive the long-tern treatment. Thus, correctly guiding patients back on track is the key of the treatment for the disease. Antidepressant medication, psychological intervention and physical therapy are frequent therapies for treatment of mixed anxiety and depression disturbance. Antidepressants such as sertraline, paroxetine and fluvoxamine are low-cost with quick effect, but the long-term use may cause adverse reactions including

dry mouth, constipation and heart rate increase. Psychological intervention and physical therapy are more recommended for mood disorders currently. The relaxation of patients during the treatment process helps patients dredge mood at the root and achieve self-control of emotion. A former study demonstrated that brain biofeedback therapy is able to strengthen emotion management awareness of patients with mental disorders and decrease generation of negative emotion by training via feedback instrument.

The present work applied brain biofeedback therapy to treat patients with mixed anxiety and depression disturbance, the consequences of which showed that HAMA and MAHD scores of two groups after treatment were lower than those before treatment and the longer the treatment time was, the lower the scores would be. Furthermore, the group treated with brain biofeedback therapy combined with paroxetine appreciably reduced HAMA and MAHD scores when contrasted with the group treated with paroxetine alone, which suggested that brain biofeedback therapy had a significant effect on improving patient's adverse mood like anxiety and depression. The mechanism might be as follows: in a relaxed state, α wave in the brain would gradually rise and reach a high amplitude when the body was completely relaxed whereas the occurrence of β wave implicated that the body was under mental stress; when the body was tired or sleepy, the brain would send out θ and δ waves, of which θ wave could promote the body to fall asleep. Brain biofeedback therapy system was able to exhibit the feedback of patients after perception of specific information. Through training the brain wave activity to maintain or enhance positive feedback, the therapy facilitated the beneficial waves and inhibited unfavorable waves to enable patients to control mood change consciously so as to further decline the levels of anxiety and depression in patients.

After treatment, the WHOQOL-100 scores were elevated in patients of both groups and relative to control group, brain biofeedback therapy notably ameliorated quality of life of patients. This perhaps attributed to: the brain biofeedback therapy effectively raised the function of nervous regulation in brain tissues of patients and restored brain dysfunction; active participation of patients enhanced their confidence for treatment; that therapy improved symptoms (insomnia and dreaminess, weakness and adynamia, dizziness and headache, loss of appetite etc.) affecting quality of life to strengthen the constitution of patients, ameliorate their psychological conditions, rejuvenate and live actively, bringing about the increase of overall quality of life. In addition, although there was no significant difference of scores in environment and social relationships between the two groups after treatment, the scores of environment and social relationships were improved after treatment relative to those before treatment, which implied that in addition to drug use and other treatment method for mixed anxiety and depression disturbance, the help and encouragement from the family and friends as well as social support and understanding are all important for ameliorating escape psychology, improving social skills and living environments.

In a word, brain biofeedback therapy had a significant effect on patients with mixed anxiety and depression disturbance, which could significantly improve patients' adverse mood including anxiety and depression and ameliorate their quality of life.

Declaration of conflict-of-interest

The authors declare no conflict-of –interest.

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