

Study on the Therapeutic Effect of Nutritional Therapy Regulating Estrogen Level on Anorexia Nervosa

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Abstract. Objective: To analyze the therapeutic effect of nutritional therapy regulating estrogen level on anorexia nervosa (AN). Methods: Fifty patients with AN treated from December 2018 to December 2021 were randomly divided into two groups. The patients in the control group received routine antidepressant treatment, and the patients in the observation group received nutritional treatment to adjust estrogen level on the basis of this, and the course of treatment was one month. The body mass index and albumin level of the two groups were observed before and after treatment. Results: After one month's treatment, the body mass index of the patients in the observation group was significantly higher than that before treatment ($P < 0.05$), while the body mass index of the patients in the control group was slightly higher than that before treatment, but the difference was not statistically significant ($P > 0.05$). After treatment, the albumin levels in both groups were higher than before treatment, but the observation group was significantly higher than the control group ($P < 0.05$). Conclusion: Nutritional therapy by regulating estrogen level can effectively improve patients' AN, which is worthy of clinical application.

Key words: Nutritional therapy, Estrogen, Anorexia nervosa.

1. Introduction

Anorexia nervosa (AN) is an eating disorder, which refers to the loss of appetite or anorexia caused by the patient's intentional diet, resulting in significant weight loss and lower than the normal standard [1]. AN can cause patients to suffer from malnutrition, physical dysfunction, metabolic abnormalities and endocrine disorders. Most of the patients are young women, and the course of disease varies. The cause of the disease has not been fully clarified. At present, it is considered that AN is a chronic disease with a high mortality rate [2]. This disease is mostly seen in teenagers and young women, and has become the most serious psychological and behavioral disorder of women growing rapidly in China in recent years, which seriously threatens the physical and mental health of young women [3]. At present, the treatment of low body mass AN is a major problem in clinical treatment. Up to now, there is no specific drug to improve the core symptoms of patients such as fear of obesity, eating behavior disorder, low body mass, etc. In clinical treatment of AN, comprehensive treatment based on nutritional treatment, psychological treatment and drug treatment [4]. Anorexia does not necessarily exist in the early stage of the disease, but only for various reasons to refuse to eat, resulting in malnutrition and decreased body functions [5]. Patients usually have edema, susceptibility to infection, severe anemia, decreased heart rate, electrolyte abnormalities

and other phenomena, and serious cases may endanger life.

Nutritional therapy aimed at increasing body mass and improving nutrition will play an important role in alleviating the physical and mental conditions of patients and improving the prognosis [6]. Therefore, the treatment of AN patients should be supplemented with nutritional support treatment to improve their nutritional status comprehensively and effectively. With the development of society and the improvement of living standards, more and more attention has been paid to the research on the correlation of this disease. It is of great clinical significance to give clinical nutritional intervention treatment to AN patients to comprehensively and effectively improve their nutritional status and improve their quality of life. In order to analyze the therapeutic effect of nutritional therapy regulating estrogen level on AN, 50 patients with this disease were treated and compared. This study will carry out nutritional treatment for patients with AN on the basis of conventional therapy under the inpatient setting, and compare the clinical efficacy with conventional therapy, so as to explore the effectiveness of auxiliary nutritional treatment for inpatients with AN and the suitability of clinical application.

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2. Materials and methods

2.1 General information

The sample is AN patients who were received from December 2018 to December 2021, and have completed a 12-week follow-up in the clinic. Inclusion criteria: ① meet the diagnostic criteria of AN in DSM-IV-TR; ② Female, Han nationality, menstruation has come; ③ Meet the indications of estrogen treatment: amenorrhea ≥ 3 months, and meet at least one of the following criteria: serum estrogen level is less than 18pg/ml, endometrial thickness is less than 5mm, and the sum of the three dimensions of B-ultrasound is less than 100mm; ④ Have not been treated with psychotropic and hormonal drugs in the past 3 months, such as 5-HT reuptake inhibitors (SSRIs), estrogen and contraceptives; ⑤ There is no contraindication for the use of estrogen and progesterone. Exclusion criteria: ① Comply with DSM-IV-TR axis I diagnosis except AN; ② Amenorrhea caused by physical diseases; ③ Have serious negative suicidal thoughts or behaviors; ④ Have serious physical diseases or physical complications; ⑤ Pregnancy, lactation, drug abuse. A total of 50 patients with AN were enrolled, including 21 patients with mental illness, 17 patients with excessive stress, 8 patients with intentional weight loss and diet, and 4 patients with unknown causes. They were randomly divided into two groups: the observation group consisted of 20 patients, aged from 17 to 28 years, with an average age of (21.4 ± 2.1) years, a course of disease of 2 to 24 months, and an average course of disease of (13.1 ± 4.2) months; In the control group, 20 patients were aged 18-29 years, with an average age of (20.8 ± 2.4) years, a course of disease of 3 to 24 months, and an average course of disease of (14.3 ± 3.1) months. There was no significant difference between the two groups in terms of age, sex, course of disease and other related factors ($P > 0.05$), which was comparable.

2.2 Method

2.2.1 Observation group

Of the 20 patients, 7 were treated with paroxetine, 6 with fluoxetine, 4 with sertraline, and 3 without antidepressants. In addition, patients were given supplementary nutritional support, and their body mass and albumin were increased through reasonable diet, improved diet structure and comprehensive nutrition. At the initial stage of admission, patients were provided with nutrition by intravenous infusion or tube feeding to maintain the balance between water and electrolyte in their bodies. After eating, 3 meals a day were all solid foods, which were taken orally. Fruit and liquid nutrients were eaten once every 2 hours after meals, and the whole process was supervised by nurses, and the supervision time lasted for 1 hour after meals. Estradiol tablet/estradiol progesterone tablets 1mg/10mg was used as estrogen supplement, and outpatient nutrition

therapy+psychological counseling+sertraline 50mg/d was used as routine treatment.

2.2.2 Control group

Of the 20 patients, 9 were treated with paroxetine, 5 with fluoxetine, 4 with sertraline, and 2 without antidepressants. In addition, the patients were only given conventional diet. The course of treatment was 1 month. The body mass index and albumin level of patients were measured before and after treatment.

2.3 Observation indicators

The body mass index and albumin level of the two groups were observed before and after treatment.

2.4 Statistical method

The data were analyzed by SPSS22.0, and all the data between groups were tested by χ^2 test, and the related data were expressed as mean standard deviation. The difference indicated by $P < 0.05$ was statistically significant.

3. Result Analysis

After one month's treatment, it was found that the body mass index of the patients in the observation group was significantly higher than that before treatment ($P < 0.05$), and that of the patients in the control group was slightly higher than that before treatment, but the difference was not statistically significant ($P > 0.05$), as shown in Table 1. There was no significant difference in albumin levels between the two groups before treatment ($P > 0.05$). After treatment, albumin levels in both groups were higher than before treatment, but the observation group was significantly higher than the control group ($P < 0.05$), as shown in Table 2.

Table 1. Body mass index of patients before and after treatment

Group	Body mass index	
	Before treatment	After treatment
Observation group	14.25±2.36	15.47±2.17
Control group	15.48±2.07	15.52±2.26

Table 2. Albumin levels of patients before and after treatment

Group	Albumin level (g/L)	
	Before treatment	After treatment
Observation group	26.9±2.88	40.6±2.99
Control group	26.8±3.01	35.7±2.86

4. Discussion

AN is a psychosomatic disease that seriously threatens the physical and mental health of female adolescents. With the development of social economy, the incidence rate of AN has been increasing recently. The etiology and pathogenesis of AN are still unknown. Moreover, AN is a refractory disease with high treatment rejection rate and high exfoliation rate before cure. Its endocrine changes are most common in the hypothalamus-pituitary-ovarian axis, and the main clinical manifestations are amenorrhea or rare menstruation. As a gynecologist, how to make early diagnosis and auxiliary treatment to promote patients to recover menstruation and fertility as soon as possible has become an increasingly important clinical proposition. AN is a refractory mental disease that tends to occur in young women. Although its etiology and pathogenesis have not been fully clarified, a large number of studies have suggested that estrogen plays an important role in the occurrence and development of AN [7]. Female AN patients have low body mass due to diet restriction and eating behavior disorder, which suppresses gonadotropin to pre-pubertal level, resulting in hypofunction of hypothalamus-pituitary-gonadal axis, low estrogen level, and clinical manifestations of amenorrhea. Although some of the AN patients in the estrogen treatment group in this study have menstruation after treatment, and they are in the state of continuous menopause after the artificial cycle stops, which may be related to the body mass not returning to the normal nutritional status. The absence of organic diseases is the premise of AN. It is the significant weight loss caused by the patient's intentional excessive diet. Usually, clinical symptoms such as endocrine disorders, metabolic disorders, emaciation and amenorrhea will occur. In recent years, the number of patients with AN is increasing, but the pathogenesis of the disease is still unclear, which may be related to the psychological factors of patients and the social environment around them.

Clinically, female AN patients have secondary osteoporosis due to long-term malnutrition and low estrogen level. Clinicians often give them estrogen and progesterone drugs to help increase bone density [8]. Therefore, it is recommended to increase the body mass of AN patients, reduce osteoporosis, restore menstruation, and improve other core symptoms of eating disorders through nutritional treatment, rather than supplement estrogen. Because the pathogenesis and pathological mechanism of AN are not clear at present, the treatment for AN is mainly symptomatic. Most patients with AN are afraid of getting fat and restrict eating. Some of them are accompanied by severe body image disorder. They are in severe malnutrition at the time of onset, and are accompanied by depression, anxiety, irritability and other mental symptoms. Therefore, AN treatment plan needs comprehensive treatment including nutritional treatment, psychological treatment and drug treatment. For patients with AN, in addition to necessary drug treatment, nutritional intervention and auxiliary treatment should also be carried out. Before carrying out nutritional support treatment, nutritionists and nursing staff should communicate with patients and their families, introduce

the treatment process to them in detail, dispel patients' concerns, maximize their trust and make them actively cooperate. After that, the dietitian and the patient will negotiate to formulate a reasonable and phased diet plan for them according to their usual eating habits. The diet should pay attention to reasonable collocation and balanced nutrition.

The endocrine mechanism of amenorrhea caused by anorexia nervosa is still unclear. Many studies believe that amenorrhea may be caused by hypothalamus-pituitary dysfunction, not simply by weight loss [9]. The hypothalamic gonadotropin-releasing hormone secretion function is low or even stops, resulting in a significant reduction in the frequency and amplitude of LH and FSH secretion, a significant reduction in estradiol secretion by the ovary, the disappearance of LH peak, and the lack of estrogen feedback, further affecting the recruitment of follicles, the formation of prepotent follicles, and the growth of endometrium. Due to the patient's long-term restriction of diet, resulting in gastrointestinal dysfunction, it is difficult to eat normally. At the initial stage of admission, the patient can be provided with nutrition by intravenous infusion or tube feeding. When the patient recovers to the state of being able to eat, the nutritionist should pay attention not to mix too much food containing dietary fiber for the patient in the early stage of nutrition support treatment to prevent the patient from being unable to tolerate the increase of intestinal volume. The AN patients can not eat normally for a long time, which leads to the abnormalities of various gastric electrophysiology and neurohormones, such as the occurrence of gastric rhythm disorder, resulting in the weakness of gastric antrum contraction, and then the emptying of solid food is significantly delayed, and the activity of digestive enzymes is inhibited. Therefore, based on the existence of gastric emptying disorder and gastric function disorder in AN patients, the formulation of diet needs to be gradual, and different nutritional treatment schemes should be adopted at different stages.

Generally, patients are unwilling to admit their illness and have low enthusiasm for treatment. They use various methods to help patients adjust their eating habits and improve their nutritional status. When patients make certain progress, they should be affirmed to increase their confidence in rehabilitation [10]. In this observation, the body mass index of patients in both groups improved after one month of treatment, but the improvement of patients in the observation group was more significant ($P < 0.05$). In addition, the albumin level of patients in the observation group after treatment was significantly higher than that in the control group ($P < 0.05$). It can be seen that the nutritional treatment that regulates the estrogen level can better improve the symptoms of AN patients. Follicles and hypophysis may present unresponsive, delayed normal response or overreaction to exogenous GnRH. These different responses may be related to the course of disease, different conditions and different degrees of hypothalamic function damage. There is no unified standard for the treatment of anorexia nervosa, which is a long-term process. The treatment methods include psychotherapy, drug therapy and adjustment of eating habits. The improvement of the patient's general condition,

the recovery of psychological state and the recovery of menstruation are important indicators to explain the treatment effect. On the basis of conventional antidepressant therapy, reasonable and effective regulation of estrogen level can help improve the malnutrition status of AN patients, and is worthy of clinical promotion. The high dropout rate of patients and the small sample size of the study may be related to the weak treatment motivation and poor compliance of AN patients. Future research needs to be designed in strict accordance with the randomized controlled experimental study, and further expand the study sample size, increase the follow-up time, and set up multiple treatment groups for further research.

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