World Scientific Research Journal Volume 8 Issue 12, 2022
ISSN: 2472-3703 DOI: 10.6911/WSRJ.202212_8(12).0015

Research Progress on The Pathogenesis and Intervention of Post-stroke Depression

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Abstract

To introduce and summarize the research progress of post-stroke depression, mainly from the pathogenesis and intervention measures. The pathogenesis is mainly summarized from the perspectives of "primary endogenous mechanism" and "stress reactive mechanism". In terms of intervention measures, the treatment methods of post-stroke depression were summarized from the perspectives of western medicine, traditional Chinese medicine, physical therapy, psychotherapy and other therapies, aiming to guide the future clinical diagnosis and treatment through the above analysis and summary, which is helpful to restore the neurological function injury of patients and improve the living standard of patients.

Keywords

Post-stroke depression; Pathogenesis; Interventions; The research progress.

1. INTRODUCTION

Post-stroke Depression (PSD) is one of the common complications of cerebrovascular diseases. It is a common psychological disorder occurring after stroke, and belongs to a kind of secondary Depression based on the occurrence of stroke. The main clinical manifestations of post-stroke depression are low mood, loss of interest, apathetic dullness, loss of appetite, etc., and even psychological tendencies and behaviors such as fantasy, delusion and suicide [1]. In recent years, domestic and foreign scholars have done a lot of research on PSD [2]. Foreign scholars [3] found that the cumulative prevalence of patients with one or more depressive symptoms within 5 years after stroke ranges from 39% to 52%, while the domestic prevalence ranges from 9.49% to 65.22% [4], and shows an increasing trend year by year [5]. In addition, stroke patients with depression have a higher degree of disability and mortality [6], which is one of the important factors affecting the recovery of stroke patients. This article introduces the clinical research progress of post-stroke depression as follows:

2. PATHOGENESIS OF POST-STROKE DEPRESSION

Opinions vary on the pathogenesis of post-stroke depression. At present, there are two widely accepted hypotheses, namely "primary endogenous mechanism" and "stress reactive mechanism" [7].

2.1. Primary endogenous mechanism

Primary endogenous mechanism, namely neurobiological mechanism, mainly includes monoamine neurotransmitter theory, neurotrophic factor theory, inflammatory response theory, hypothalamic-pituitary-adrenal axis (HPA axis) imbalance theory, brain-gut axis

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202212_8(12).0015

imbalance theory, etc. [8]. Among the many theories of the pathogenesis of PSD, the theory of monoamine neurotransmitter is the most widely recognized at present. A large number of studies have found that the decrease of monoamine neurotransmitters such as 5-hydroxytryptamine (5-HT), norepinephrine (NE) and dopamine (DA) after stroke is closely related to the occurrence of PSD [9]. The "neurotrophic factor hypothesis" states that the prefrontal cortex and hippocampus are damaged, and a large number of neurons die, leading to a decrease in neurotrophic factors and ultimately depression. Studies have shown that the decrease of neurotrophic factor (BDNF) and nerve growth factor (NGF) in the hippocampus and cortical regions that regulate emotion will cause the occurrence of PSD [10]. The occurrence of stroke is often accompanied by a series of inflammatory reactions, and inflammatory factors play a very important role in its occurrence and development. Studies have found that PSD, one of the most common complications of stroke, is also closely related to inflammatory factors [11]. Wang Xusheng et al. [12] found that the mRNA expressions of IL-1 β and TNF- α in hippocampus and serum IL-17A levels in PSD model rats were higher than those in stroke model rats. The hypothalamic-pituitary-adrenal axis (HPA axis) is an important part of the neuroendocrine system, which can participate in the coordination of human emotions, behaviors and the homeostasis of the nervous system. Studies have found that abnormal activation of HPA axis is one of the causes of PSD [13]. Nie Bengang et al. [14] found that the plasma levels of cortisol (Cor), adrenal corticotropin-releasing hormone (CRH) and adrenal corticotropic hormone (ACTH) in PSD patients were significantly higher than those in non-PSD patients and normal controls. At the end of last century, American researchers proposed the concept of "brain-gut axis" bidirectional functional channel on the basis of "enteric nervous system". The human brain and gastrointestinal tract can be bidirectional regulated and influenced by central nervous system, neuro-endocrine system, immunity and intestinal flora [15]. On this basis, researchers have conducted further research and connected the brain-gut axis with human cognitive and emotional centers, proving that stroke patients with depression can aggravate gastrointestinal symptoms, and the occurrence of PSD is related to the "brain-gut axis" to a certain extent [16].

2.2. Stress reactive mechanism

Stress reactivity mechanism, namely social psychology mechanism, is closely related to patients' emotions and psychological states.

According to the theory of reactive mechanism, negative and negative emotions occur mainly due to the decline or even loss of body function, need for action, decreased living ability, and the gap between the status and role in society and family and those before the disease after stroke, which develop into psychological disorders over time [7]. Chun-yan Yang and other research has found that age, culture level, nerve function damage degree, the relationship between nurses and patients and the economic level is closely related to the occurrence of poststroke depression, age, cultural level is lower, nerve function defect degree of the heavier, relationship between nurses and patients is not harmonious, the worse economic level, the more probability of suffering from depression after stroke [17]. Chen Ying et al. [18] found that post-stroke depression is a frequent complication of stroke, which is closely related to gender, hypertension, past history, social support and other factors, and the above factors are independent risk factors leading to the severity of post-stroke depression. XingXiaoJuan [19] research shows that the damage rate of the neural function performance were positively correlated with poststroke depression disease, investigate its reason, nerve function defect will further lead to the degree of pathological changes in depression patients, transmission and further affect brain neurotransmitters released, on the other hand, may also be due to nerve function defect are happening in patients with higher morbidity, More likely to lose the ability to work, reduce the

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202212_8(12).0015

quality of life, further affect the standard of living, aggravate the psychological pressure of patients.

3. INTERVENTION MEASURES FOR POST-STROKE DEPRESSION

3.1. Western medicine treatment

Chinese Expert Consensus on Clinical Practice of Post-stroke Depression recommended PSD treatment drugs include SSRIs such as fluoxetine, citalopram and sertraline, SNRIs such as venlafaxine and duloxetine, and TCAs such as amitriptyline and Doxel [20]. Wang Liying et al. [21] found that agomelatine had obvious therapeutic effect on post-stroke depression, and the anxiety and depression symptoms of patients in the observation group were significantly improved after 8 weeks of treatment. The application of estazolam combined with escitalopram oxalate in the treatment of post-stroke depression patients with sleep disorders has a good effect, which can effectively relieve the anxiety and depression of patients, improve their sleep quality, improve their cognitive ability and daily living ability, without increasing more adverse reactions [22]. Zhang Xue et al. [23] found that flupenthixol melitracen tablets combined with trazodone hydrochloride tablets have significant clinical effects in the treatment of post-stroke depression, which can not only effectively reduce the degree of neurological impairment in patients, but also improve the depression of patients with less adverse reactions. In addition, studies have confirmed that fluoxetine can significantly reduce neurological deficits in patients with post-stroke depression, improve neurological function, relieve depression, and improve clinical treatment compliance, which is worthy of recommendation [24]. Li Jin [25] conducted a clinical study on 96 patients with post-stroke depression and randomly divided them into two groups. Both groups were treated with paxil, while the observation group was treated with olanzapine. The results showed that paxil combined with olanzapine had a good clinical effect and high safety in the treatment of post-stroke depression. In conclusion, combination therapy has better clinical efficacy and higher safety than single therapy in the treatment of post-stroke depression.

3.2. TCM drug therapy

Post-stroke depression is attributed to the "stroke" and "depression syndrome" of traditional Chinese medicine. The dysfunction of Yin and Yang of zang-fu organs, qi and blood, retention of wind, fire, phlegm and blood stasis and other pathological products in the brain lead to hemiplegia and other diseases. Long-term thinking, depression and liver qi stagnation lead to post-stroke depression of "depression caused by disease" [26]. Sun Tianye et al. [27] analyzed the effectiveness and safety of oral Chinese patent medicine combined with selective serotonin reuptake inhibitor in the treatment of post-stroke depression, and the 8 oral Chinese patent medicine combined with SSRIs included in the study showed their own advantages in the treatment of PSD. According to the results of the study, SGJY, JYW, YXQN play a good role in depression and neurological function recovery of patients, and the physical and chemical indicators of the body are changing accordingly. TMXL may have good effects on depression, neurotransmitter levels and adverse reactions because it can effectively improve sleep conditions and other factors. Wu Chunlan et al. [28] established an animal model of post-stroke depression. In the TCM group, Xiaoyao Jieyu formula, which "loosens the liver, promotes Qi and dispels Yu", was administered by gavage continuously for 28 days, and 5-HT was found in the rats in the TCM group

The results were statistically significant, indicating that Xiaoyao Jieyu can improve the depressive state of rats by regulating the content of 5-HT.

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202212_8(12).0015

3.3. Physical therapy

Low-frequency repetitive transcranial magnetic stimulation [29], as a kind of physical therapy, has been widely used in the treatment of post-stroke depression in recent years. It has the advantages of non-invasive, painless, safe and effective, and has a good effect on depression, insomnia, numbness, Parkinson and other diseases. The study of Liu Jie et al. [30] proved that on the basis of rehabilitation training, patients with post-stroke depression were given the treatment

R TMS treatment can effectively improve the clinical symptoms of patients, improve the levels of 5-HIAA and 5-HT, improve the quality of life and social function of patients.

3.4. Psychotherapy

3.4.1 Structured group psychotherapy

Structured psychotherapy helps patients improve the interpersonal interaction within the group by establishing a group situation, so as to improve the social relationship between patients and others [31]. Structured group psychotherapy helps patients feel the beauty of life by organizing members to share the wonderful events in their lives, thus improving patients' autonomy and enthusiasm in treatment, which is conducive to improving the effect of rehabilitation treatment and alleviating patients' depression and anxiety [32].

3.4.2 Emotion-behavioral therapy

Affective behavior therapy is a feasible psychological treatment method, which can relieve the psychological pain of patients, build positive emotions and help relieve adverse mood disorders [33]. Zhu Ning et al. [34] found that RBT combined with sertraline treatment can better improve the negative emotions of patients with post-stroke depression, reduce the severity of insomnia, enable patients to better cooperate with rehabilitation training, and improve their self-care ability in daily life.

3.4.3 Virtual reality technology

Virtual reality technology is a new technology, widely used in teaching, game production, rehabilitation, psychological treatment and other aspects, it uses computer generated simulation of the real environment, and with the help of sensing equipment to put the experiencers into the environment, as if immersive, with

It has the characteristics of interactivity, immersion and conception [35]. Dang Ming et al. [36] found that virtual reality technology combined with emotional intervention can effectively improve the depressive symptoms of patients with post-stroke depression, improve compliance behavior, and promote the recovery of impaired neurological function.

3.4.4 Mindfulness therapy

Mindfulness-based stress reduction (MBSR) is mainly based on mindfulness theory to train the physical and mental strength of patients, so as to reduce their self-pressure and improve their bad emotions. Ruan Chunrui et al. [37] studied elderly patients with post-stroke depression and found that mindfulness therapy combined with improved breathing training had a good effect on elderly patients with post-stroke depression, which was worthy of promotion.

3.5. Other treatment methods

In addition to the above treatment, acupuncture and moxibustion, music therapy, medical ozone therapy, psychological nursing, combined Chinese and western medicine treatment, drug combination therapy and other treatments have been applied to clinical, the treatment for each have each advantage, through clinical validation has certain curative effect, all can be used for the treatment of poststroke depression of clinical applications.

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202212_8(12).0015

4. SUMMARY

In conclusion, in recent years, with the increasing incidence of stroke, the prevalence of post-stroke depression is also increasing year by year, which has been paid more and more attention by more and more doctors, and in-depth research and exploration have been conducted. However, the occurrence, development, treatment and rehabilitation of this disease is a long-term process, and the pathogenesis of this disease is varied. At present, there are two widely accepted hypotheses, namely "primary endogenous mechanism" and "stress reactive mechanism". Therefore, there is no single and effective treatment for PSD. Most western medicine treats PSD with antidepressant drugs as the main means, but long-term use of western medicine will inevitably lead to drug resistance, dependence and other adverse reactions. Traditional Chinese medicine, as a traditional medicine in China, can effectively and timely observe the changes of the patient's condition by means of observation, smell, questioning and cutting. Through comprehensive analysis of the patient's condition through holistic treatment and syndrome differentiation, combined with acupuncture, moxibustion, massage and other external treatment with traditional Chinese medicine characteristics can effectively improve the patient's condition. As a treatment method for post-stroke depression, psychotherapy has been widely used in clinical practice because it is non-invasive and has no side effects. The combination of traditional Chinese and western medicine, drug therapy and psychotherapy is the trend of PSD treatment in the future. Although there are still various problems in the diagnosis and treatment of PSD at present, and there is no systematic diagnosis and treatment guideline, we should uphold the principle of early detection, early intervention and early treatment, and combine various treatment methods to improve clinical efficacy, reduce side effects and improve the quality of life of patients.

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