—————Short Communication—————

Efficacy of Modified Electroconvulsive Therapy in Conjunction with Aripiprazole and Lorazepam in Managing Schizophrenia

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To observe the efficacy of modified electroconvulsive therapy in conjunction with aripiprazole and lorazepam in patients with schizophrenia. The study population for our research comprised 100 patients with schizophrenia, who were admitted to our hospital during the period from June 2022 to June 2023. Two groups were formed; each consisting of 50 randomly assigned patients. For the control group, the treatment regimen included aripiprazole together with lorazepam, while the observation group received modified electroconvulsive therapy in addition to the control group's treatment for 8 w. Assessment of the patient's psychological symptoms was conducted utilizing the positive and negative syndrome scale, with their cognitive function assessed using the Wechsler adult intelligence scale. Observations and recordings of any adverse reactions that arose during the treatment were made for both groups. Prior to the initiation of treatment, statistical analysis revealed no significant differences (p>0.05) in positive and negative syndrome scale scores and Wechsler adult intelligence scale scores between the control group and the observation group. Subsequent to the treatment, both groups registered noteworthy declines in positive and negative syndrome scale scores compared to their pre-treatment scores, demonstrating statistical significance (p<0.05). Additionally, the observation group achieved lower scores than the control group, exhibiting a remarkable difference (p<0.05). As for Wechsler adult intelligence scale scores, both groups exhibited notable improvements after the treatment, with the observation group displaying a greater level of progress as opposed to the control group (p<0.05). No statistically significant distinction in the frequency of adverse reactions was observed between the two groups during the treatment duration (p>0.05). The incorporation of modified electroconvulsive therapy in conjunction with aripiprazole and lorazepam showcases notable efficacy in symptom improvement and cognitive function enhancement for individuals with schizophrenia, accompanied by a commendable safety profile.

Key words: Modified electroconvulsive therapy, aripiprazole, lorazepam, schizophrenia

With its enduring cognitive and emotional impairments, as well as distortions in reality like delusions and hallucinations[1], schizophrenia profoundly influences the lives and social functioning of individuals, placing a significant burden on both patients and their families[2,3]. Despite the ongoing uncertainty surrounding the precise etiology of schizophrenia, pharmacotherapy remains a cornerstone in the management of this condition[4]. Nonetheless, there are instances where traditional antipsychotic medication treatment may present limitations, such as inadequate treatment response, severe adverse reactions, or acute exacerbation of schizophrenia during the course of treatment. Consequently, it is imperative to explore alternative treatment options that offer enhanced efficacy. Acting as a dopamine system stabilizer, aripiprazole has the capacity to inhibit the binding of dopamine D2 receptors and serotonin receptors, effectively reducing central nervous system excitability and stabilizing neurotransmitters. As a result, it demonstrates notable improvement effects on both the positive and negative symptoms experienced by patients with schizophrenia[5,6]. Nevertheless, studies have indicated that relying solely on medication treatment may result in variable effectiveness and

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potential disruptions in glucose and lipid metabolism[7,8]. Lorazepam, which falls under the benzodiazepine category of psychiatric drugs, exerts central sedative and anti-anxiety effects by activating gamma-aminobutyric acid in the body, all while leaving the cardiovascular and respiratory systems unaffected. When used in conjunction with aripiprazole, it can enhance the efficacy of the treatment[9]. Modified Electroconvulsive Therapy (MECT), a commonly used physical treatment method in clinical practice, can induce temporary electrical stimulation of cortical cells in the brain, which leads to physiological and chemical changes in the brain and improves brain metabolism, thus achieving the goal of treating mental disorders[10,11]. However, there are relatively few reported studies on the combined use of MECT and medication treatment for schizophrenia. The incorporation of aripiprazole and lorazepam into MECT holds promise for yielding a synergistic effect, ultimately improving the overall effectiveness of the treatment. Therefore, the primary goal of this research is to evaluate the efficacy of integrating MECT with aripiprazole and lorazepam in treating patients with schizophrenia. Furthermore, it seeks to analyze the effectiveness and safety of this treatment modality in improving symptoms and optimizing quality of life. The results obtained from this study will yield pivotal evidence that can inform and shape clinical practice, ultimately expanding the range of more effective treatment alternatives available to patients with schizophrenia. In the period spanning from June 2022 to June 2023, a cohort of 100 patients with schizophrenia receiving treatment at our hospital were enrolled in this study. Through randomization, these patients were divided into two groups; the control group and the observation group, with 50 patients assigned to each group. In the control group, there were 27 male and 23 female participants, with ages ranging from 23 y to 55 y and an average age of (33.57±7.05) y. The duration of illness in this group varied from 9 mo to 8 y, with an average duration of (4.05±1.17) y. Among the participants in the observation group, there were 30 males and 20 females, with ages ranging from 25 y to 62 y and an average age of (34.17±9.28) y. The average duration of illness in this group was (4.18±1.06) y, with a range spanning from 8 mo to 7 y. The absence of statistically significant differences in general information (p>0.05) between the two groups implies their comparability. Inclusion criteria for this study were as follows, meeting the diagnostic criteria for schizophrenia[12]; having a clear clinical diagnosis, demonstrating good treatment compliance, and possessing the ability to adhere to medical advice and receive appropriate treatment and care; not having taken any antipsychotic medication within the past 2 w; patient's family accepting the proposed treatment plan and showing no objections towards the treatment and care measures, with the patient and their family signing an informed consent form. The exclusion criteria encompassed the following severe impairment of hepatic or renal function; allergy to any of the drugs utilized in the study; pregnancy or lactation; non-compliance with medical guidance or inability to complete the treatment and presence of alcoholism, severe aggression, or organic brain lesions. Aripiprazole, obtained from Jiangsu Enhua Pharmaceutical Co., Ltd., (Approval No: NMPA H20140121), was administered to the control group. The treatment initiated with a daily dose of 2.5 mg and could be increased up to a maximum of 20 mg. Lorazepam (Manufacturer: Shandong Xinyi Pharmaceutical Co., Ltd., Approval No: NMPA H20060105) was administered orally at a dose of 1 mg once a day. Following 2 w of treatment, the medication dosage was modified according to the individual patient's condition, and subsequently increased to a range of 2-3 mg/day, which was then sustained for a duration of 8 w. The observation group underwent MECT as an adjunct to the treatment provided to the control group. Prior to each MECT session, the patient's mental status was assessed 1 d in advance, and routine examinations, including electrocardiography and biochemical tests, were carried out. The patient fasted for 8 h and refrained from drinking for 4 h before the treatment. The treatment was performed using a seizure-free electrical convulsive therapy device (Spectrum 5000Q, Somatics, United States of America (USA)) with the following parameters; voltage 450 V, current 900 mA, and stimulation duration of (1-3) s. The patient was placed in a supine position and received intravenous anesthesia with propofol. The electrodes with conductive gel were accurately placed on both temples of the patient for electrical stimulation. The duration of each stimulation was 3 s. Close monitoring of the patient's vital signs occurred throughout the treatment process. Subsequent to the completion of treatment, the patient was promptly returned to the ward in a conscious state and without experiencing any discomfort. Initially, the treatment frequency was set at 2-3 times per week, but after 6 w, it was

modified to once a week. The duration of the treatment spanned 8 w. The Positive and Negative Syndrome Scale (PANSS) was utilized as a means to assess the psychiatric symptoms of patients, both prior to and following treatment. This scale primarily targets the evaluation of positive symptoms, negative symptoms and general psychopathology. Within the realm of positive symptoms, assessment items include delusions, excitement, hostility and more. Conversely, emotional dullness, difficulty in abstract thinking, and other assessment items signify negative symptoms. General psychopathology encompasses assessment items such as anxiety, motor retardation and others. These items are scored on a scale of 0-7. The scoring range for positive and negative symptoms is 0-49, while for general psychopathology, it is 0-112. The patient's psychiatric symptoms are considered more severe when their score on the assessment is higher[13]. The Wechsler Adult Intelligence Scale (WAIS) was employed to evaluate cognitive function, with emphasis placed on measuring operational IQ and verbal IQ[14]. The occurrence of adverse reactions, encompassing symptoms such as dizziness, headache, hypotension, insomnia, decreased appetite, and numerous others, was closely monitored and recorded in both groups of patients during the treatment period. Statistical Package for the Social Sciences (SPSS) 25.0 will be employed to perform the statistical analysis in this research. Means and standard deviations will be reported for continuous variables and analyzed through t-tests, while frequencies and percentages n, (%) will be used to represent categorical variables and assessed using Chi-square (χ^2) tests. Statistical significance will be assessed using a significance level of p<0.05. The PANSS assessment scores for negative symptoms, positive symptoms, and general psychopathology revealed a noteworthy decrease (p<0.05) in both groups following treatment when compared to the scores observed before treatment. Upon comparing the groups, it was revealed in Table 1 that the scores for these three aspects were remarkably lower in the observation group as opposed to the control group (p<0.05). The scores for operational IQ and verbal IQ did not differ notably (p>0.05) between the two groups before treatment. However, after treatment, both groups exhibited a remarkable increase in scores for operational IQ and verbal IQ compared to their pre-treatment scores, with a more substantial improvement observed in the observation group as opposed to the control group

(p<0.05) (Table 2). Throughout the treatment period, both groups of patients encountered adverse reactions, including dizziness, headache, hypotension, insomnia, and decreased appetite. The overall incidence of adverse reactions in the observation group was 20.0 %, slightly exceeding the 12 % observed in the control group, though the difference did not reach statistical significance (p>0.05) (Table 3). The etiology of schizophrenia is extremely complex, with multiple factors such as genetic factors, environmental factors, and abnormal brain structure changes believed to contribute to its development[15]. This study aimed to assess the efficacy of integrating aripiprazole and lorazepam with MECT for treating individuals diagnosed with schizophrenia. The findings of this study revealed noteworthy enhancements in psychiatric symptoms and intelligence scores among patients in both the observation group and the control group after 8 w of uninterrupted treatment. Initially, it was noted that the scores for negative symptoms, positive symptoms and general psychopathology in the PANSS assessment displayed a remarkable reduction in both groups following treatment. This indicated that MECT in conjunction with aripiprazole and lorazepam effectively reduced the symptom burden of schizophrenia. Moreover, in regards to these three aspects, the observation group displayed superior improvement compared to the control group, implying that the incorporation of MECT could augment treatment efficacy. At the same time, the treatment outcomes for the control group also reached a certain level of clinical effectiveness. Secondly, significant improvements in scores for operational IQ and verbal IQ were observed in both groups following treatment. The observation group displayed a greater increase compared to the control group, possibly attributable to the neuroregulatory effects associated with the integration of MECT. However, prior to treatment, there was little variation in intelligence scores between the two groups, suggesting that the patients in both groups had comparable baseline intelligence levels. Additionally, both groups of patients experienced certain adverse reactions during the treatment period, such as dizziness, headache, hypotension, insomnia, and decreased appetite. The observation group displayed a slightly higher overall incidence of adverse reactions compared to the control group, although the difference did not reach statistical significance. This indicates that the incorporation of MECT into

aripiprazole and lorazepam treatment does not lead to a notable increase in the risk of adverse reactions, in contrast to medication treatment alone. Nevertheless, it is crucial to diligently monitor and effectively address any adverse reactions that may arise during the course of treatment. This study had limitations worth noting, including a relatively small sample size of 100 patients, which could potentially affect the interpretation and generalizability of the results. Moreover, it is worth mentioning that this study exclusively involved patients from a single hospital, which introduces the possibility of selection bias and may hinder the generalizability of the study findings. Given the relatively brief treatment duration of 8 w in this study, it may not provide ample time to observe long-term treatment effects or potential relapses. Consequently, conducting extensive long-term follow-up is imperative to ascertain the durability and stability of treatment effects. Therefore, larger-scale, long-term controlled studies are needed in the future to further validate and expand upon the findings of this study. In conclusion, MECT in conjunction with aripiprazole and lorazepam demonstrated noteworthy efficacy in improving symptoms and enhancing intelligence in individuals with schizophrenia. This treatment approach may exert its effects through various mechanisms, including symptom inhibition, improvement of cognitive function and modulation of neural network activity. Furthermore, this treatment approach showed good safety.

TABLE 1: SKIN CONDITION ASSESSMENT

Group (n=50)	Positive symptom score		Negative symptom score		General psychopathology	
	Before	After	Before	After	Before	After
Observation	22.52±5.20	12.72±3.52	27.40±4.44	11.18±3.48	39.66±5.42	25.56±4.20
Control	21.94±6.26	18.04±3.65	26.34±5.60	17.12±3.83	40.58±6.22	31.90±5.18
t	-0.504	7.424	-1.048	8.115	-0.788	6.729
p	0.615	0.000	0.297	0.000	0.433	0.000

TABLE 2: WAIS SCORE

Group (n=50)	Operational IQ		Verbal IQ	
	Before	After	Before	After
Observation	77.70±6.74	89.10±7.50*	77.70±8.07	85.96±7.94*
Control	79.24±9.05	84.38±7.78*	75.90±8.02	81.1±8.16*
t	0.965	-3.09	0.936	-3.018
p	0.337	0.003	0.266	0.003

Note: (*) Indicates significant difference after treatment compared with before treatment

TABLE 3: ADVERSE REACTIONS n, (%)

Group (n=50)	Dizziness and headache	Hypotension	Insomnia	Anorexia	Overall incidence
Observation	2 (4.0)	1 (2.0)	3 (6.0)	4 (8.0)	10 (20.0)
Control	2 (4.0)	1 (2.0)	2 (4.0)	1 (2.0)	6 (12.0)
χ^2			1.19		
p			0.275		

Conflict of interests:

The authors declared no conflict of interests.

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