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Electroconvulsive therapy plays an irreplaceable role in treatment of major depressive disorder

Mei-Lin Ma, Lian-Ping He

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Abstract

Major depressive disorder is a serious and common neuropsychiatric disorder that affects more than 350 million people worldwide. Electroconvulsive therapy is the oldest and most effective treatment available for the treatment of severe major depressive disorder. Electroconvulsive therapy modifies structural network changes in patients with major depressive disorder and schizophrenia. And it can also affect neuroinflammatory responses and may have neuroprotective effects. Electroconvulsive therapy plays an irreplaceable role in the treatment of major depressive disorder.

Key Words: Depression; Electroconvulsive therapy; Major depressive disorder; Somatic cell therapy

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Core Tip: Electroconvulsive therapy has been shown to be very useful for the acute treatment of major depressive, manic, and mixed states, especially those with a high degree of suicide, as well as catatonic and drug-resistant depression. It should not be seen as a second line of defense after drug therapy.

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TO THE EDITOR

In a recent review, Xin-Ke Li *et al*[1] expounded the neuroimaging research progress of electroconvulsive therapy (ECT) for major depressive disorder. The authors concluded that the neurobiological mechanism of ECT may be to modulate the functional activity and connectivity or neural structural plasticity of specific brain regions to normal levels for therapeutic effect. We fully agree with the authors and hereby elaborate on the importance and potential of ECT for major depressive disorder.

ECT mainly achieves therapeutic effects by increasing the synthesis and uptake of norepinephrine in the body and improving the sensitivity of serotonergic neurons. The prevailing view on the mechanism of ECT is that a cascade of reactions is triggered by electrical stimulation of specific areas of the brain. Consequently, neuronal synaptic plasticity and the levels of various neurotrophic factors and synaptic cleft transmitters are altered. Therefore, ECT has a significant therapeutic effect on a variety of mental disorders[2]. A series of studies have proved that ECT is especially suitable for major depressive disorder[3], manic acute episodes, and schizophrenia, especially some acute patients, those with acute affective symptoms, and catatonic patients[3,4].

ECT has the function of regulating the neuroinflammatory response. When subjected to external stress, there is an inflammatory response that activates indole-amine 2,3-dioxygenase and degrades TRP to kynurenine (KYN), which is metabolized to kynurenic acid (KYNA) and 3-hydroxykynurenine (3-HK). Then, KYNA and 3-HK are converted to quinolinic acid[5]. 3-HK and quinolinic acid have neurotoxic effects on the central nervous system, while KYNA is neuroprotective. Major depressive disorder exacerbates the immune inflammatory response, leading to an increase in BDNF. Several studies have shown that ECT increases KYNA levels[6]. This suggests that ECT may have neuroprotective effects.

In addition, accumulating neuroimaging evidence suggests that ECT modulates medial temporal and prefrontal cortical regions in major depressive disorder. Source-based morphometry (a multivariate statistical approach for structural data analysis) revealed that the medial temporal lobe network (including the hippocampus and parahippocampal cortex) was significantly increased after ECT[7]. What's more, a study shows that brain plasticity is induced by changes in gray matter volume (GMV) during treatment for schizophrenia[8]. GMV was determined using voxel-based morphometry whole-brain analysis. These studies provide a broader perspective on the mechanism of action of ECT in the treatment of depression.

In general, ECT has played a very important role in the treatment of some depressive disorders, especially major depressive disorders. In the past decade, however, the role of physical therapy in some neuropsychiatric disorders has been underestimated or partially ignored. Most practitioners only consider ECT when a patient has failed to respond to many medication therapies. Such attempts can last months or years, delaying treatment while also increasing the patient's mental instability and prolonging their suffering. And due to a series of reasons such as ideology[9] and social environment, the role of ECT has not been fully exerted. ECT should not be seen as a last resort for psychiatric treatment.

FOOTNOTES

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