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New Ways of Predicting Efficacy of Antidepressants
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Abstract

Major depressive disorder (MDD) is a neuroendocrine condition that is becoming increasingly prevalent in society. According to the World Health Organization, MDD is a "common and debilitating disorder" (p. 61) and it has a very complex pathophysiology. Until recently, a definitive strategy that had been found, however, had been the administration of psychiatrist-recommended targeted neurotrophic factor (BDNF) and cognitive-emotional biomarkers may be a key in the mechanism of this disorder.

A literature review of articles found in PubMed, Cochrane Library, and PsycINFO for the last 10 years focused on the hypothesis of MDD, MDD cognitive-emotional biomarkers, and BDNF. The review found that MDD has a multitude of interconnected systems that involve cognitive-emotional mechanisms, and it is very difficult to find a treatment option that works. However, cognitive-emotional biomarkers were able to predict the efficacy of antidepressant treatment in the MDD. BDNF was also found to be decreased in patients with MDD and increased after treatment with certain medications. These systems may help predict treatment response and an overall improvement of the burden of this disease.

Key Terms: brain-derived neurotrophic factor, serotonin, noradrenaline, receptor antagonists, and serotonin uptake inhibitors

Introduction

According to Cai et al. (2015), "a mood disorder characterized by prominent and persistent low mood, marked social withdrawal, cognitive impairment, and somatic symptoms" (p. 61). The Centers for Disease Control and Prevention (2016) states that almost 10% of adults aged 40-60 and more than 1 out of 20 Americans 12 years of age and older reported current depression. "Cognitive deficits are considered as key symptoms of cognitive depression that are associated both with suboptimal responses to antidepressants and reduced remission rates" (Calabrese, 2016, p. 1259). In the last decade, there has been an abundance of research showing that levels of neurotrophins, such as BDNF in the brain, may be involved in the pathophysiology of MDD and may accurately predict the efficacy of antidepressants and the remission of depressive symptoms. This purpose of the review is to determine how BDNF and cognitive-emotional biomarkers factor into the pathophysiology of MDD, and if they can accurately predict the efficacy and outcome of certain antidepressants.

Statement of the Problem

According to Cai et al. (2015), "MDD can reduce the capacity of a patient to study, work, and engage in social skills" (p. 61). It also increases the risk of suicide and disability rate and has a lifetime risk of 80% (Cai et al., 2015). Accordig to the World Health Organization, there were 300 million patients with MDD in 2015. "It is estimated that by 2020, the disease burden caused by MDD will be ranked next to cancer and diabetes" (Cai et al., 2015, p. 61). The strategy of MDD has not been completely understood, according to Ronkina-Dmitrieva et al. (2013), and many new hypotheses in the pathophysiology of MDD have been formulated. Antidepressant treatment only has an efficacy of 60% - 70%, and more than 1 out of 20 Americans 12 years of age and older reported current depression. As more definitive mechanisms are discovered, treatment options can be more effective as they are tailored to the specific mechanism.

Applicability to Clinical Practice

In clinical practice, MDD is a disease process that will be encountered many times in a patient's life. Based on cognitive and emotional tests performed prior to antidepressant treatment, studies were able to predict treatment response to certain SSRIs and SNRIs. BDNF is decreased in patients with MDD and certain antidepressants are able to increase this level. Some studies showed that a higher BDNF level showed a larger antidepressant response.

Literature Review

Pathophysiology of Major Depressive Disorder

Mononeuropathy-deficiency hypothesis only partly explains the pathophysiology of MDD. Other hypotheses in the pathophysiology of MDD include inflammatory cytokines, hypothalamo-pituitary-adrenal axis, glutamate receptors, BDNF dysfunction, increased apoptosis, & vitamin D dysregulation.

According to Cai et al. (2015), "MDD is a mental disorder characterized by prominent and persistent low mood, marked social withdrawal, cognitive impairment, and somatic symptoms" (p.61). The literature reviewed is focused on the hypothesis of MDD, cognitive-emotional and BDNF. The review found that MDD has a multitude of interconnected systems that involve cognitive-emotional mechanisms, and it is very difficult to find a treatment option that works. However, cognitive-emotional biomarkers were able to predict the efficacy of antidepressant treatment in the MDD. BDNF was also found to be decreased in patients with MDD and increased after treatment with certain medications. These systems may help predict treatment response and an overall improvement of the burden of this disease.

Research Questions

In adults with MDD, does BDNF play a role in the pathophysiology of MDD?
In treatment of adults with MDD, do cognitive biomarkers predict the efficacy and outcome of treatment and remission?
In treatment of adults with MDD, does BDNF predict the efficacy and outcome of treatment and remission?

References


