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New Ways of Predicting Efficacy of Antidepressants

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Abstract

Major depressive disorder (MDD) is a neuropsychiatric condition that is becoming increasingly prevalent in the United States. According to the National Institute of Mental Health, MDD is common and debilitating. In its constellation of symptoms, MDD is often accompanied by cognitive and emotional symptoms, which are commonly experienced by individuals with the disorder. In the field of psychological research, the etiology of MDD has not been completely understood, according to Ristevska et al. (2015). Antidepressant treatment only has an efficacy of 60% in the population (Klaain et al., 2013). This low efficacy has led to the search for new ways to predict antidepressant treatment response. In this review, we will discuss various methods that have been used in predicting antidepressant treatment response. We will then discuss the limitations of these methods and the future directions that need to be taken to improve our understanding of MDD and its treatment. Finally, we will conclude with a discussion on the future of antidepressant treatment research.

Introduction

MDD, according to Cai et al. (2015), “is a mood disorder characterized by prominent and persistent low mood, mental retardation, cognitive impairment, volitional decline, and severity of symptoms.” It is reported that the Centers for Disease Control and Prevention (2016) states that almost 10% of adults aged 40-64 and more than 10% of Americans aged 12 years and older reported current depression. Cognitive dysfunction has been considered as a major symptom of depression and is associated with both subclinical and clinical outcomes. Cai et al. (2015) states that “clinical outcome is highly correlated with the degree of depression severity.”

Brain Derived Neurotrophic Factor

Brain-derived neurotrophic factor (BDNF) is a neurotrophin that is expressed in the brain and may be involved in the pathophysiology of MDD. The expression of BDNF is regulated by a variety of factors, including environmental stress, inflammation, and drug treatments. There is strong evidence that BDNF is involved in the pathophysiology of MDD and may play a role in the treatment response of antidepressants.

Cognitive & Emotional Biomarkers

Cognitive and emotional biomarkers have been proposed as potential predictors of antidepressant treatment response. Cognitive biomarkers include memory, attention, and executive function, while emotional biomarkers include mood, anxiety, and depression. A literature review of articles found in PubMed, CINAHL, Cochrane Library, and PsycINFO within the last ten years focused on the hypotheses of the pathophysiology of MDD, emotional biomarkers, and BDNF. The review found that MDD has a multitude of interconnected systems that are involved in the pathophysiology of MDD, and that BDNF may play a role in the regulation of these systems.

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.” It also increases the risk of suicide and disability rates and has a significant impact on the quality of life. According to the World Health Organization, there were 300 million patients with MDD in 2015. It is estimated that 1 to 2% of the US adult population suffers from MDD each year. The etiology of MDD has not been completely understood, according to Ristevska et al. (2015). Antidepressant treatment only has an efficacy of 60% in the population (Klaain et al., 2013). This low efficacy has led to the search for new ways to predict antidepressant treatment response. In this review, we will discuss various methods that have been used in predicting antidepressant treatment response. We will then discuss the limitations of these methods and the future directions that need to be taken to improve our understanding of MDD and its treatment. Finally, we will conclude with a discussion on the future of antidepressant treatment research.

Literature Review

Pathophysiology of Major Depressive Disorder

Monoamine deficiency hypothesis only partly explains the pathophysiology of MDD. Brain-derived neurotrophic factor (BDNF) is a neurotrophin that is expressed in the brain and may be involved in the pathophysiology of MDD. Cai et al. (2015) states that “clinical outcome is highly correlated with the degree of depression severity.”

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Reported Brain Neurotrophic Factors

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?

In treatment of adults with MDD, does BDNF predict the efficacy and outcome of treatment and remission?

Discussion

MDD, according to Cai et al. (2015), “is a mood disorder characterized by prominent and persistent low mood, mental retardation, cognitive impairment, volitional decline, and severity of symptoms.” It is reported that the Centers for Disease Control and Prevention (2016) states that almost 10% of adults aged 40-64 and more than 10% of Americans aged 12 years and older reported current depression. Cognitive dysfunction has been considered as a major symptom of depression and is associated with both subclinical and clinical outcomes. Cai et al. (2015) states that “clinical outcome is highly correlated with the degree of depression severity.”

Applicability to Clinical Practice

In clinical practice, MDD is a disease process that will be encountered many times in a lifetime. According to the World Health Organization, there were 300 million patients with MDD in 2015. It is estimated that 1 to 2% of the US adult population suffers from MDD each year. The etiology of MDD has not been completely understood, according to Ristevska et al. (2015). Antidepressant treatment only has an efficacy of 60% in the population (Klaain et al., 2013). This low efficacy has led to the search for new ways to predict antidepressant treatment response. In this review, we will discuss various methods that have been used in predicting antidepressant treatment response. We will then discuss the limitations of these methods and the future directions that need to be taken to improve our understanding of MDD and its treatment. Finally, we will conclude with a discussion on the future of antidepressant treatment research.

References


Ide, S., Kakeda, S., Watanabe, K., Yoshimura, R., Abe, O., Hayashi, K., …Korogi, Y. (2015). Relationship between striatal paroxetine predicts IRBD remission differences by SMR compared to SSRI. Regarding effects of medications, Gyrik et al. (2016) showed that remission rates were higher if they received escitalopram versus sertraline or venlafaxine. Participants that were predicted to not reach remission had a very high recurrence rate.

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