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Editorial

Brain Magnetic Resonance Imaging Findings in Patients with Depressive Disorders

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Abstract

Objective: The aim of this study is to identify the changes on brain magnetic resonance imaging in patients suffering from depressive disorders.

Methodology: Data and findings were taken from previous studies that have been covering brain changes demonstrated on serial magnetic resonance imaging among individuals diagnosed with major depressive disorder. **Results:** Reductions in the size of the hippocampus, basal ganglia, orbital frontal cortex, prefrontal cortex, putamen, caudate nucleus, amygdala, anterior and posterior cingulate, insula and temporal lobes whereas lateral ventricles enlarged.

Conclusion: Patients suffering from depressive disorders demonstrate significant brain changes that are apparent on magnetic resonance imaging scan but it's unknown whether these changes are causes or consequences of depressive illness.

Keywords: *Major Depressive Disorder; Brain Magnetic Resonance Imaging; Hippocampus; Orbital Frontal Cortex.*

Introduction

Major depressive disorder (MDD) is a serious mental disorder that is characterized by at minimum one depressive episode lasting for at least 2 weeks and involving changes in mood, pleasure, interests, cognitive symptoms and vegetative symptoms. The symptoms that characterize major depressive episode and major depressive disorder overlap with depressive symptoms among bipolar disorder and schizophrenic patients; that is the reason why the application of exclusion criteria enables diagnosis of MDD [1].

Studies estimate that around 10% to 15% of population will experience clinically significant depressive symptoms during their lifetime, and around 9% of women and about 5% of men will experience symptoms of depressive disorder according to World Health Organization (WHO). Twin, adoption and family studies indicated that genetics play important roles in development of MDD. Twin studies suggest heritability of around 40 - 50%, and family studies demonstrate two to three folds increase in lifetime risk of developing depressive disorder among first-degree relatives [2].

Many studies have shown that a major depressive episode is characterised by typical neuroendocrine and sleep-EEG alterations. Over activity of the hypothalamic pituitary (HPA) axis, a key neuroendocrine alteration observed in patients suffering from an acute major depressive episode, is assumed to reflect an elevation of hypothalamic corticotropin-releasing hormone (CRH) and vasopressin secretion [3].

Symptoms of depression, minor depression, persistent depressive disorders (dysthymic disorder) and major depressive disorder represent a continuum of depressive symptom severity in unipolar depressive disorder, in which each level is associated with significant stepwise impairment and deterioration in psychosocial disability [4].

Beside mental and somatic symptoms, depressive disordered patients have brain changes that can be readily seen in brain imaging scans, thus this study aimed at identifying the changes on brain magnetic resonance imaging (MRI) in patients suffering from depressive disorders since this issue has not been extensively studied in literature.

Methodology

Data and findings were taken from previous studies that have been covering brain changes demonstrated on serial MRI scans among individuals diagnosed with major depressive disorder.

Significant brain changes on MRI were documented in such patients and have been recorded and summarized in a short paper.

Results

Findings from this study showed that there are consistent reductions in the size of the hippocampus, basal ganglia, or-

bital frontal cortex and subgenual prefrontal cortex in MDD patients [5].

Specific changes include lower gray matter volumes in amygdala, dorsal frontomedian cortex, and right paracingulate cortex [6].

Moreover, patients showed large reductions in the size of frontal regions, particularly in anterior cingulate and orbitofrontal cortex and showed smaller reductions in prefrontal cortex whereas hippocampus, caudate nucleus and putamen showed moderate reductions in volume [7].

In addition, another paper found that depressed individuals had significantly lower hippocampal volumes, smaller amygdala, larger lateral ventricles, and larger caudate volumes [8].

Furthermore, adults having MDD had thin cortical gray matter in orbitofrontal cortex, insula, anterior and posterior cingulate, and in the temporal lobes. On the other hand, adolescents showed smaller total surface area and frontal lobes regional reductions (superior frontal gyrus and medial orbitofrontal cortex) and higher-order somatosensory, visual and motor areas [9].

Discussion

It's important to request an MRI of the brain in every patient presenting with prominent symptoms of depression particularly if it's for long duration, to rule out specific neurological aetiology of depressive illness as cerebrovascular disease, brain tumours in frontal lobes and multiple sclerosis.

Although above neurological diseases are frequently associated with depressive psychopathology, clinically it's difficult to determine whether these neurological diseases resulted in depression or both of them simultaneously present. Clues for differentiation probably can be helped by knowing the chronology and the predominance of symptoms.

Conclusion

This study concluded that patients suffering from depressive disorders demonstrate significant brain changes that are apparent on MRI scan. The relationship between brain changes and depressive disorders are complex and yet not fully understood. It's still unknown that whether these brain abnormalities are actually causes or consequences of depression, and thus more study is needed to discuss this dilemma.

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