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Case Report

Short but continuous natural pain during meditation sittings for depression treatment: a case report

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Abstract

Major depressive disorder (MDD) is a common mental disorder, which results in seriously impaired condition in the patients and great global disability burden. In light of its quite diverse etiologies, comorbidity with many other diseases, and complex underlying pathology, it has been a great challenge to understand the physiological basis of MDD, which may be a complex of related diseases, rather than a single one. In addition to the partial understanding of MDD, the individual heterogeneities among patients may render the development of a universal treatment an elusive goal. But studying how each of currently available treatments affects the disease can generate useful information to stratify patients into different subtypes for individualized treatments. In this case report, we present the first report of repeated success of using meditation as the only treatment of MDD, compared to initial success but no remission with other conventional antidepressants on the same patient. We hypothesized that *the short but continuous natural pain during one-hour meditation sittings has the therapeutic effect to treat depression in the case of this patient and potentially others with MDD*. This special opportunity of eliminating tremendous heterogeneity among different individuals has enabled us to probe deeply into the potential mechanism of depression treatments and the complex physiology of depression itself, both of which have likely profound implications in the treatment of other MDD patients as well. More importantly, this case report helps us to dissect one specific component of meditation for its long-known and well-established benefit against depression.

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Introduction

Major depressive disorder (MDD) is a common mental disorder, which results in seriously impaired condition in the patients and great global disability burden (1, 2). Conventional antidepressants often take weeks or months to demonstrate full effect, not all patients have a good response, relapse rate is high even for those effective treatment, and only a subset of patients achieved remission, raising the question of either the complexity of the disease or the effectiveness of those antidepressants (3, 4).

In light of its quite diverse etiologies, comorbidity with many other diseases, and complex underlying pathology, it has been a great challenge to understand the physiological basis of MDD, which may be a complex of related diseases, rather than a single one. In addition to the partial understanding of MDD, the individual heterogeneities among patients may further render the development of a universal treatment an elusive goal. But studying how each of the currently available treatments affects the disease can generate useful information to stratify patients into different subtypes for individualized treatment as an ultimate goal (5).

Case report

A 30-year-old, right-handed man with recurrent MDD (DSM-5 diagnostic code 296.3) (6) was admitted to the GHC-SCW Capitol Regent mental health clinic (Madison, Wisconsin) for his worsening depressive episodes that rendered him unable to work. Symptoms included depressed mood, anhedonia, altered sleeping pattern and appetite, and impaired cognitive capabilities. The first diagnosis of MDD was made in 2012 (Table 1) and contributing factors might include seasonal changes and some work-related stress. The occurrence of his depression showed a strong seasonal pattern, with a start in late fall or early winter and an end in late spring or early summer. Past medical history was otherwise unremarkable. The patient's father had a history of alcohol abuse and mental illness (no clinical diagnosis, but likely schizophrenia), which also led to his premature death at the age of 44. Written informed consent was obtained from the patient for publication of this report.

A timeline of diagnosis and treatment is listed in Table 1. Several points of particular significance have been made as below:

1. Worsening of allergic response to pollens happened concomitantly with the development of depression symptoms, whereas disappearance of the allergy reaction always took place at the beginning of depression recovery.
2. There were good and fast responses to multiple medications including sertraline, a combination of sertraline and bupropion, and psilocybin, but remission was not achieved.
3. Other adjustment methods were tried by the patient, such as psychotherapy, exercises, light therapy, and nutritional supplements, but none resulted in consistent improvement.

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4. Meditation practice repeatedly led to the patient's recovery from depression in 2017 and 2018.

Two key observations have contributed to our hypothesis that *the Short but Continuous natural Pain (SCP) during one-hour meditation sittings has the therapeutic effect to treat depression in the case of this patient and potentially others with MDD.*

First, the acute relief of allergic reactions after the first one-hour sitting without major movements during the meditation retreat in 2018, which marked the start of improved depression symptoms, did not take place at earlier times of the retreat, when the patient performed multiple one-hour sittings each day but with some movements to relieve leg pain. The critical difference between the one therapeutic sitting and previous non-therapeutic ones was continuous pain perception. This first observation indicated that the pain in this specific context is sufficient to reduce depression symptoms.

Second, the patient relapsed at the end of 2017 even though he maintained meditation sittings on most days, but with shorter time and adjusting movements during almost all sittings, and thus rarely experienced SCP. This second observation suggested that SCP is necessary for the therapeutic effect against depression.

Discussion

To our knowledge, this is the first report of repeated success of using meditation as the only treatment of MDD, compared to initial success but no remission with other conventional antidepressants on the same patient. This special opportunity of eliminating tremendous heterogeneity among different individuals has enabled us to probe deeply into the potential mechanisms of depression treatments and the complex physiology of depression itself, both of which have likely profound implications in the treatment of other MDD patients as well. Our proposed hypothesis above is counterintuitive to the current understanding of the relationship between depression and chronic pain, so *a more comprehensive review has been provided in a separate publication due to space limit*.

Pain and depression are inter-connected through the endocrine, immune, and nervous systems. These systems communicate with each other and contribute a dynamic equilibrium and system homeostasis, which are exemplified at different levels, such as Th1/2 balance and synaptic plasticity (7, 8). But dysregulation triggered by stress can lead to shifts in balance and the system may not be able to return to homeostasis and exemplified again at different levels, such as Th1/2 imbalance and synaptic malfunctions (9).

Multiple factors influence the function of the immune and nervous systems, such as inflammatory cytokines, monoamines, and neural synapses, whose imbalance has been proposed to be involved in the development of depression (5, 9–12). Ultimately, the system reaches maladaptative states that have symptomatic presentations. This could help explain increased allergic sensitivity to pollen during depression and remarkably decreased allergic response to pollen as the start of recovery from depression observed

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in our case. In this vein, ketamine as well as other new fast-acting antidepressants could exert their fast antidepressant effect through their ability to manipulate body's response to external and internal stimuli (13–23). Similarly, conventional antidepressants and psilocybin might function through monoamine related pain pathways (24–26). However, shifting maladaptative states of the body make it an elusive goal to achieve remission, which could be supported by research findings such as distinct changes in depressive symptoms upon ketamine administration between depressed and healthy subjects (27).

In the case of our patient's repeated recovery from depression using meditation, SCP could well function as a sustained stressor and stimulate the hypothalamic-pituitary-adrenal axis and the sympathetic nervous system, which lead to glucocorticoid (GC) release and anti-inflammatory effects, or could act through the parasympathetic nervous system and the cholinergic anti-inflammatory pathway (reduction in production of inflammatory cytokines and relief of allergic responses) (8, 10, 28, 29). The inability to adapt is one unique property of pain sensation from other senses, which would be dampened by constant stimulations (30). In this sense, SCP lasts long enough to trigger significant changes in the pain pathways and potentially benefit depression recovery despite shifting maladaptative states of the body, through fine tuning the inter-connected endocrine, immune, and nervous systems. Similarly, exercise, fish oil consumption, controlled breathing, and other relaxation therapies have been implicated in increasing vagus nerve activity and decreasing pro-inflammatory cytokine release, consistent with observed clinic benefits of vagus nerve stimulation against depression (8, 31–33). Last but not least, Meditation associated pain has also been described by others (34).

Acute pain can be useful to trigger reflex to prevent injury, whereas chronic pain is generally detrimental, but what lies in between? SCP may exhibit different properties from those two types of pain and represent an exciting new research area that has been largely neglected to date. Our hypothesis remains to be proved and verified in other MDD patients and the proposed potential mechanisms merit future investigation.

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Contribution and statement of conflicts

Conceived and designed research (MH); wrote and revised manuscript (MH).

The authors report no biomedical financial interests or potential conflicts of interest.

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Table 1. History of treatment and related symptoms in a case of recurrent MDD

Time period	Depression related symptoms and treatment
Nov 2011 – May 2012	➢ Fatigue, but complete blood count normal and TSH only slightly above the normal range ➢ Spring pollen allergy and cetirizine prescribed ➢ First diagnosis of MDD, single episode, moderate on Apr 13, 2012 ➢ Initial four weeks of treatment with Sertraline 50 mg/day resulted in no depression relief, so dose increased to 100 mg/day starting on May 1 and *depression symptoms subdued almost completely within several hours after taking the increased dose of Sertraline* ➢ Depression recovery witnessed by both primary physician and psychiatrist ➢ Sertraline stopped around Aug 2012 ➢ Depression free until Nov 2012
Nov 2012 – Apr 2013	➢ Visit of primary physician on Nov 20, 2012 due to depression symptoms ➢ Resuming sertraline 100mg/day resulted in no depression relief ➢ Diagnosis of recurrent major depression on Apr 8, 2013 ➢ Addition of bupropion 150 mg/day to sertraline 100mg/day from Apr 24, 2013 and *depression symptoms subdued almost completely within 36 hours after taking the medication* ➢ Depression recovery witnessed by psychiatrist
May 2013 – Sep 2015	➢ Continued medication of bupropion 150 mg/day and sertraline 100mg/day ➢ Depressive symptoms during winter and spring (seemingly less severe) and recovery in summer and fall ➢ Concurrent allergy reaction to pollens in the spring ➢ Visit of psychiatrist on May 8, 2014 due to recurrent depression symptoms ➢ Pollen allergy confirmed in a lab test on May 16, 2014 ➢ Stop of medications after consultation with psychiatrist on Sep 3, 2015 ➢ Depression free until Dec 2015
Dec 2015 – Jun 2016	➢ Resuming medication of bupropion 150 mg/day and sertraline 100mg/day resulted in no depression relief ➢ Visit of psychiatrist on Jan 29, 2016 due to recurrent depression symptoms ➢ Changed medication of bupropion 300 mg/day and sertraline 100mg/day after visit of psychiatrist on Mar 10, 2016 resulted in no depression relief ➢ Concurrent allergy reaction to pollens in the spring ➢ Changed medication of bupropion 300 mg/day and duloxetine 30 mg/day after visit of psychiatrist on May 3, 2016 resulted in no depression relief ➢ Initiated psychotherapy with Joshua Olson, LMFT on May 11, 2016

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	➢ Initiated micro-dosing with psilocybin-containing mushroom on May 26, 2016 and noticed recovery from depression within 24 hours ➢ Antidepressants stopped from May 28, 2016 and micro-dosing stopped from Jun 29, 2016 ➢ Depression recovery witnessed by therapist and depression free until Dec 2016
Dec 2016 – Apr 2017	➢ Resuming micro-dosing with psilocybin-containing mushroom from Dec 12, 2016 resulted in no depression relief ➢ Restarted psychotherapy with Joshua Olson, LMFT on Jan 6, 2017 due to recurrent depression ➢ Resuming medication of bupropion 150 mg/day and duloxetine 30 mg/day after visit of primary physician (Sarah Spolum, PA-C) on Jan 9, 2017 resulted in no depression relief ➢ Changed medication of bupropion 300 mg/day and duloxetine 60 mg/day after visit of primary physician on Feb 6, 2017 resulted in no depression relief ➢ Changed medication of bupropion 450 mg/day and duloxetine 60 mg/day after visit of psychiatrist on Mar 14, 2017 resulted in no depression relief ➢ Changed medication of bupropion 450 mg/day and duloxetine 40/20 mg/day after visit of psychiatrist on Apr 12, 2017 due to low blood pressure ➢ Concurrent allergy reaction to pollens in the spring ➢ All medications stopped before the meditation retreat of Apr 19-30, 2017 and noticed recovery from depression from May 1, 2017 ➢ Meditation maintained daily but with compromised practice ➢ Depression recovery witnessed by primary physician and depression free until Dec 2017
Dec 2017 – Apr 2018	➢ Restarted psychotherapy with Joshua Olson, LMFT on Dec 11, 2017 due to recurrent depression ➢ Started Liothyronine 25 mg/day due to hypothyroidism after a visit of psychiatrist on Dec 13, 2017 and a lab test the following day ➢ Addition of fluoxetine 10 mg/day to Liothyronine 25 mg/day after visit of primary physician on Dec 22, 2017 resulted in no depression relief ➢ Changed medication of fluoxetine 10 mg/day and Liothyronine 12.5 mg/day on Jan 30, 2018 due to abnormally high T3 ➢ Changed medication of fluoxetine 20 mg/day to Liothyronine 12.5 mg/day from Jan 31, 2018 after visit of psychiatrist Graham Cody, MD resulted in no depression relief ➢ All medications stopped before the meditation retreat of Mar 7-18, 2018 and noticed recovery of depression from Mar 11, 2018 ➢ Concurrent allergy reaction to pollens in the spring but subdued quickly after the first one hour of meditation sitting without major movement on Mar 11, 2018

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	➢ Depression recovery witnessed by therapist, primary physician, and psychiatrist

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