INTEGRATING NEUROFEEDBACK, NUTRITION & NUTRIGENOMICS

A Case Study of pharmaceutical withdrawal and serotonin toxicity

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Abstract

Serotonin syndrome, also known as serotonin toxicity, is a potentially life threatening adverse drug reaction caused by excessive serotonergic agonism in the central and peripheral nervous system serotonergic receptors. The symptoms of serotonin toxicity are often described as a triad of neuron-excitatory features that include neuromuscular hyperactivity (tremor, clonus, myoclonus, and hyperreflexia), and in advanced cases spasticity; altered mental status (agitation, excitement and confusion), autonomic hyperactivity (diaphoresis, fever, tachycardia and tachypnea), not all of these findings are consistently present. The following case highlights the proper recognition and treatment of serotonin toxicity through the application of non-pharmacological, science-based therapies, specifically low energy neurofeedback and nutrigenomics, for a client who presented symptoms of serotonin toxicity resulting from Celexa, a psychotropic medication.

Keywords: Serotonin toxicity, non-pharmacological therapies, low energy neurofeedback, nutrigenomics, Celexa.

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Case Study

A 55 year-old female was transported to the emergency room (ER) by ambulance due to severe tremors and fast, irregular heartbeat. Upon arrival she was treated with hydration IVs. However, the cause of her distress was not determined as a result of an inadequate intake and assessment on the part of the staff. The patient was referred to a neurologist and released from ER. The following day the patient contacted Harmonized Brain Centers for low energy neurofeedback treatment.

1. Assessment

1.1. The Central Nervous System Function Assessment (CNS)

The initial CNS assessment revealed that her symptoms included: tremors, headache, loss of appetite, tiredness, rapid and irregular heartbeat, agitation and restlessness. She was unable to drive a motor vehicle and unable to work.

1.2. Medication Assessment

The patient was taking 150 mg of Celexa for the past 5 years.

2. CELEXA (Citalopram)

It is used to treat depression. It may improve energy level and feelings of well-being. Citalopram is known as a selective serotonin reuptake inhibitor (SSRI). This medication helps to restore the balance of serotonin in the brain.

2.1. Side Effects

Loss of appetite, tiredness, blurred vision, seeing rainbows around lights at night.

2.2. Severe Side Effects

Fast, irregular heartbeat. This medication may increase serotonin levels and can cause serotonin syndrome toxicity that involves a fast heartbeat, loss of coordination, severe dizziness, unusual agitation and restlessness.

2.3. Initial diagnosis

We considered that due to her symptoms and the long-term use of Celexa that she was experiencing **serotonin syndrome toxicity**. She agreed to a Celexa titration plan.

3. Materials and Equipment

Over the past decade we have treated a significant number of pharmaceutical medication dependents on different medications. The materials, equipment and methodology employed have demonstrated efficacy and include the following:

3.1. Nutrition

Nutritional Psychiatry is a rapidly growing field that provides a significant body of research evidence that strongly suggest that dietary patterns are relevant to common mental illnesses. Studies indicate that there are known consistent mechanistic, observational and interventional data that diet quality may be a modifiable risk factor for mental illness. These studies are based on the understanding that specific biological pathways mediate the observed relationships between diet, nutrition and mental health that point to the immune system oxidative biology, brain plasticity and the microbiome-gut-brain axis as key targets for nutritional interventions. (Wolfgang, et al, 2017; Jacka, 2017). Recent studies indicate a strong correlation between a poor diet and the exacerbation of mood disorders, including anxiety and depression (Adan, et al. 2019).

Ross (2018) notes that integrative neuro-nutritional therapy is an emerging paradigm in the treatment of mental health disorders, which focuses on the relationship between nutrition, brain neurochemistry, brain function and behavior. She reports current evidence to support the recognition that dietary habits, nutrition, and metabolic mechanism that include inflammation, microbiota imbalances oxidative stress, and impaired mitochondrial function are important variables that affect brain function, mental health, and, ultimately mood and behavior.

3.2. Low Energy Neurofeedback Systems (LENS)

Low Energy Neurofeedback System utilizes a gentle, non-invasive EEG neurofeedback that optimizes function in the areas of mood, cognition and energy levels. The LENS system has led to dramatic improvements in chronic debilitating neurological conditions such as brain injury, extreme stress, emotional trauma, attention deficit disorder, fibromyalgia, and chemical dependence. Other disorders effectively treated with LENS include traumatic brain injury, migraine headaches, addictive behaviors, anxiety and depression, PTSD, autism, spectrum disorders, seizure disorders, ADHD, cerebral palsy, and even optimal brain performance (Hammond 2001, 2007, 2011 A&B, 2012 A&B, Larsen, 2006, 2008, 2012, Ochs, 1994 a & b, 2011).

3.3. Nutrigenomics

Nutrigenomics is the study of how nutrients and naturally occurring compounds affect gene expression. Nuclear factor erythroid 2–related factor 2 (Nrf2) is a regulator of cellular resistance to oxidative stress and enhances the body's natural defenses to make antioxidants and achieve optimal cellular balance. Nuclear respiratory factor 1 (NRF1) works on the cellular level to increase cellular energy by boosting mitochondrial function, while nicotinamide adenine dinucleotide (NAD) helps to support energy, mental clarity, and mood. These nutrigenomic products have been developed as a drug-free therapy to integrate genetic expression and remove neurotoxic contaminations. These key activators work to prevent oxidative stress and mitochondrial dysfunction which are pre-cursers to Substance Use Disorder and are strongly correlated with anxiety and depression (Klalifeh, et al, 2016) and autism (Chauhan & Chauhan, 2006). Neurofeedback researchers have found that integrating these nutrigenomic factors to neurofeedback clients creates a synergistic-effect in that total amplitudes of the brain waves become unsuppressed at a much faster rate (Miller & Shepard, 2020).

3.4. Photon Stimulator – Light Therapy

Low level laser therapy (LLLT) is the application of light (usually a low power laser) to a pathology to promote tissue regeneration, reduce inflammation and relieve both acute and chronic pain.

4. Methods – An Integrative Approach

Stephanie Ross (2014) reported: In regard to the complexity of mental health disorders, such as depression, anxiety, and insomnia, which are common comorbid psychiatric conditions, it would appear that a holistic treatment model that incorporates a complementary and integrative therapy approach within the framework of conventional health care would most effectively support optimal healing. This study coordinated nutrition, neurofeedback and nutrigenomics therapies for a successful outcome. Each is described below:

4.1. LENS

Following the initial assessment and diagnosis, LENS was administered. The initial Mapping indicated severely suppressed amplitudes for all brain waves. Suppression is the flexibility in sites measured by the standard deviation between the average of the wave lengths mean total amplitude or the individual wave length broken down by dominant, delta, theta, alpha or beta frequencies. When a site has a standard deviation less than .35 % that site is considered suppressed or inflexible. Lifting of suppression has been a key indicator in the improvement in brain processing which leads to behavioral, emotional, and physical improvements. We have found that LENS therapy assists in withdrawal from antidepressants by lifting suppressed sites or increasing the efficiency of the brain to process. After LENS sessions subjects are more relaxed and less depressed. Their thinking is clearer and they begin to have more emotional resilience instead of being overwhelmed by their emotions. When the nervous system is stabilized, they become less over-reactive Miller a,b,c). Three subsequent LENS trainings were provided to treat the suppressed EEG sites, 7 site at a time. The initial map and follow up map showed significant improvement for the Mean Total Amplitude reports and Mean Dominant Frequency Amplitude reports (See map reports in Results Section).

4.2. Nutrition

A balanced amino acid nutritional plan was introduced and subject began a new dietary regime to change her former nutritionally deficient diet.

4.3. Nutrigenomics

The plant based nutrigenomic products were introduced on a daily basis. These products are designed to activate energy and balance health on a cellular and genetic level. Clinical studies have shown them to reduce cellular stress by an average of 40%, glutathione by 300% and catalase by 54%. The tri-synergizers (Nrf2, NRF1 & NAD) are specifically designed to support an increase in healing, focus, energy, mental clarity and mood.

4.4. Titration from Celexa

The client's Celexa usage was tapered off slowly by utilizing a carefully planned titration strategy to help avoid withdrawal symptoms. The synergistic effect of coordinating LENS, nutrition and Nutrigenomics assists in balancing feelings that would normally arise during times of stress Miller, 2019).

4.5. Photon Stimulator

The photon stimulator was applied to the subject's pain points and provided considerable relief.

5. Results

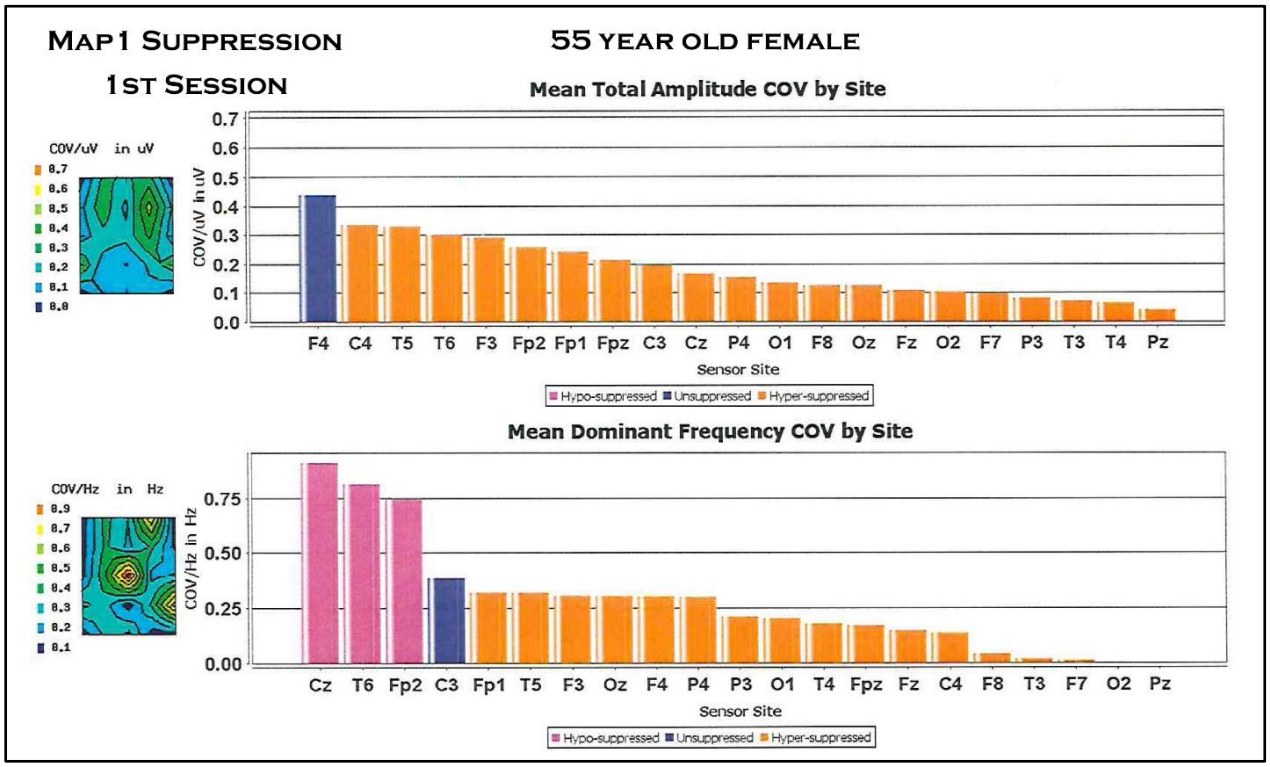
5.1. Nutrition

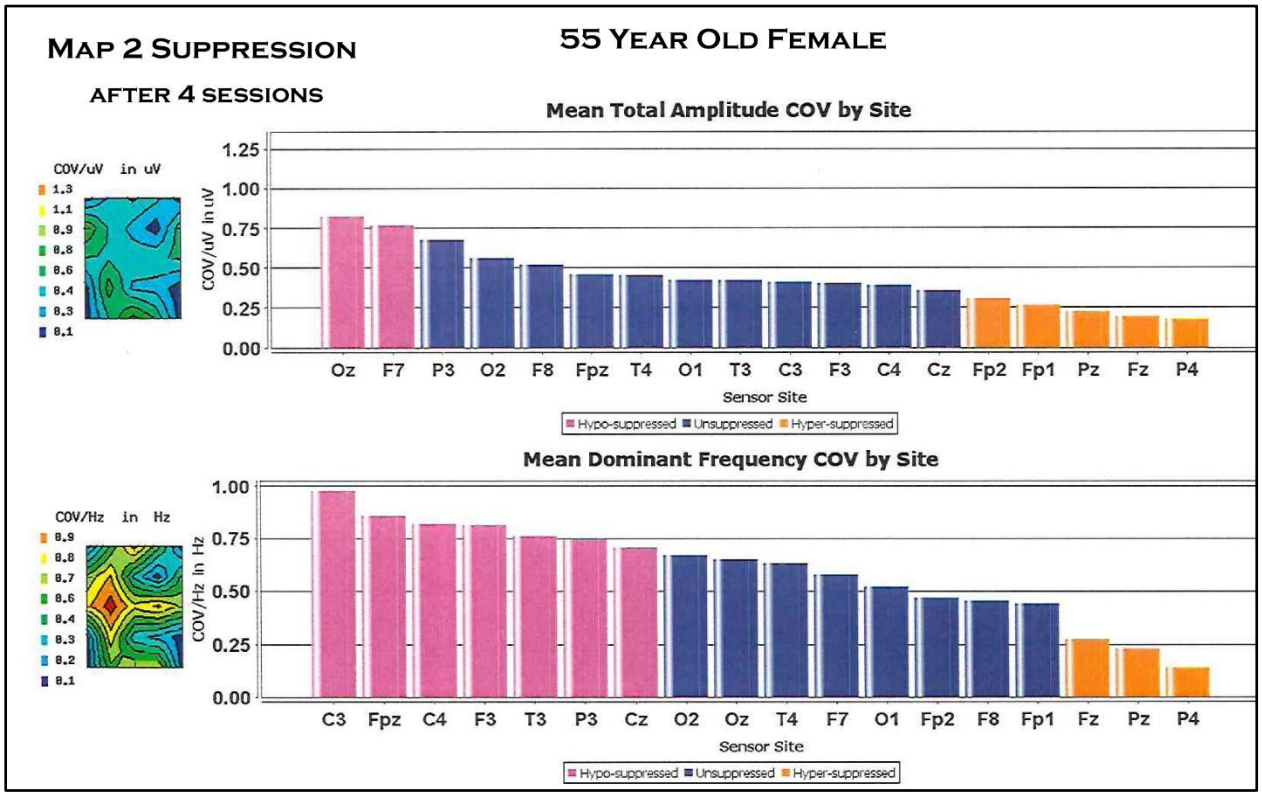
A balanced amino acid nutritional plan was introduced and subject began a new dietary regime to change her former nutritionally deficient diet made a huge difference in her ability to function, handle anxiety, and go back to work. Her former diet

consisted of unhealthy, processed foods which augment the inflammatory process that leads to decreased motivation and depression. Healthy eating and hydration which includes portion control, meal frequency and a balanced diet with adequate water is essential for all areas of health.

5.2. Neurofeedback

The two LENS suppression maps presented below represent the initial map, while the second map report indicates the significant changes in the Mean Total Amplitude and the Mean Dominant Frequency amplitudes following only three LENS sessions. The suppressed sites (orange sites hyper-suppressed) have less flexibility and do not meet our preset requirements of a normal range between .35% and .7%. These sites are not working as efficiently as they could with processing inhibited. The blue sites fall within our range that we are looking for over the period of our treatments. The purple sites are hypo-suppressed meaning they are above the .7% range. Ideally we want more blue sites meaning the brain is becoming more flexible and can process information more efficiently. The difference between Map 1 and Map 2 is quite dramatic correlating to the physical, emotional and behavioral changes as described.





Although the results do not present correlation coefficients of a multiple variate analysis to determine the value of each therapy represented in the methodology, we are suggesting a synergistic effect of nutrition, neurofeedback and nutrigenomics to create such a remarkable, measurable difference. This assumption is based on previous experiences in providing LENS trainings without adjunct therapies and realizing a much slower, lower improvement in our attempt to raise the total amplitudes of suppressed sites. The clinical outcomes is significant and showed that within a one week period, the subject stopped shaking, tremors dissipated, arm mobility increased, heart rate normalized, and a full-night sleep was restored, with an improved function that allowed the subject to return to driving a car and go back to work. Through the application of integrative health therapies with low energy neurofeedback (LENS), we anticipate that future sessions will demonstrate significantly improved outcomes in measurable results.

6. Summary

This paper presented a case of 55 year old female who was diagnosed with serotonin syndrome or serotonin toxicity. The patient underwent treatment using low energy neurofeedback and nutrigenomics therapy. The results showed a measurable difference and improvement in the condition due to synergistic effect of nutrition, neurofeedback and nutrigenomics.

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We acknowledge facilitation in this research by Harmonized Brain Center which is a multicenter integrative neurotherapy practice located in Colorado and Tennessee (USA). It is a pioneer in the integration of neurofeedback, nutrition and nutrigenomics in patient treatment protocols that continue to demonstrate enhanced positive outcomes, supported by measurable results when using evidence-based integrative health strategies that are essential for optimal wellness.

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