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Understanding: The Experience of a Brain Injury

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ABSTRACT

This article is written from my Clinical Research Project: "Listening to the Brain/Recovering the Brain/Mind." The goal of this project is to better understand the process and treatment of healing damage to the brain/mind. This is not an easy task and requires a lot of commitment from both the clinician and the patient. In this article I explore, through a case study, one of the main obstacles to healing damage to the brain/mind: how stress and even simple demands on the brain/mind for action drive the brain injury to worse places. The article follows the journey of one patient (Ms. S) as she strives to work on how stressful situations and demands on her brain for routine life actions rapidly drain her energy. The article also explores the details of how mitochondria in the nerve cells (those little energy factories) are a major factor in secondary damage from brain trauma, including TBI, strokes, seizures, infections in the brain, brain illnesses and diseases, major mental illness, and PTSD. And how patients can deal with their chronic fatigue as a result of damage to mitochondrial functioning. A major factor in the recovery of brain trauma is how rapidly stressful situations and even simple demands on the brain for work and action lead to chronic fatigue due to mitochondrial dysfunction. The article concludes with a protocol for the treatment of damage to the brain/mind that addresses mitochondrial dysfunction.

Keywords

Brain Injury, Mitochondria, Post-Concussion Syndrome, Neuro-psychoanalysis, Stress/Demands on the Brain.

Introduction

Five years ago, I began a clinical research project I titled "Listen to the Brain/Recovering the Brain/Mind." The goal of this research project was to gain a better understanding of the process of healing damage to the brain/mind. I use the term brain/mind to clarify the connection that the human mind is the subjective experience of the human brain. This perspective does raise the issue that if it's not in the brain, then it's not available in the human mind. I will reserve an answer to this complicated question for another article. Here I want to explore a very important aspect of healing damage to the brain: the role of stress and demands on an injured brain, which in my experience dramatically interferes with the healing process.

The Case

Ms. S is a 50-year-old woman with a long history of C-PTSD and Post-Concussion Syndrome (PCS) dating back to her adolescence. Sadly, she never received any treatment for her Post-Concussion Syndrome problems, and only psychotropic medications for her C-PTSD. After being on Trazadone for a decade, she voluntarily took herself off the medication and promptly started going "crazy" without the medication to keep her calm (and functional). Feeling like she was always crawling out of her skin, experiencing very little sleep, struggling with increasing depression and major panic attacks, and very frightened that she was going to have another blackout (these were serious and could have left her with a broken neck falling down a set of stairs), she came to my office on the advice of a good friend. Yes, and by her own admission, she was "a mess!"

Fortunately, she was a cooperative patient and after a rough start she began to make a lot of progress. I will refer to her condition as the "perfect storm" in the brain. PCS slows the brain down like working with a slow computer, while C-PTSD speeds up the body's stress hormones. This is a clash of opposing processing in the mind/brain/body that makes people feel crazy. Below, I will share some of the dialogue from her treatment that addresses the issue of daily stressors and normal demands on a brain/mind/body, which she experienced as the "perfect storm." As an important

perspective in her treatment and in this article, my research made it very clear to me that "stress drives brain trauma." In my experience, this includes traumatic brain injuries, strokes, seizure disorders, infections in the brain, brain illnesses and diseases, major mental illness, and PTSD. In this article I explore the dynamics of this perspective through her case. (See my article on how our legal system compromises so many people with brain injuries by increasing their stress levels through court cases that drag on forever) [1].

Before I share some of this dialogue, I note my understanding that a great deal can be learned about the patient's difficulties and specifically what they need help with by listening neuro-psychoanalytically [2-4]. Note here that throughout her dialogue, and the progression of her treatment, stressful days, even mild ones, drive the symptoms of her PCS. Stress drives damage to the brain/mind, and as you will see this is not easy to cope with.

(P) "Yesterday I was able to go to the grocery store, and I was mostly okay……But today, I couldn't even leave the house."

(D) "What do you think is the difference between yesterday and today with your brain?"

(P) "I don't really know. It's very strange isn't it. Such a big change from one day to the next."

(D) "Do you think this has anything to do with your energy levels? Which I believe varies from day to day depending on how much is eaten up by too much stress."

(P) "Maybe…… And maybe my motivation. I just don't feel very motivated today."

(D) "Is it possible that your trip to the grocery store drained your energy, and it takes more than a day to recuperate from the trip, both your energy level and your motivation?"

(P) "That's true. I do have limited energy these days. Definitely more energy than before we started working together. And I do appreciate the improvement, but apparently this improvement is still not enough."

(D) "So, no matter what you do to improve things the chronic fatigue is still there?"

(P) "Unfortunately, yes."

(D) "What was it like going to the store yesterday?"

(P) "Well……I start getting anxious just getting into my car to drive to the grocery store."

(D) "Anxious about? Anxiety is your brain's way of anticipating some kind of problem or danger coming ahead, and letting you know."

(P) "What could be that dangerous? It's just the grocery store!"

(D) "Is it going to the grocery store on an injured brain? Your brain's processing of the world is way off. And therefore, simple things get magnified and out of balance."

How do we understand what is happening for Ms. S as she attempts to negotiate grocery shopping? When the brain is injured neuroplasticity naturally seeks to find new pathways for the neurons to connect with. However, this creates two new problems. One, it takes more energy from an already damaged brain that is running on an energy deficit. And two, this re-routing is a very slow process. Then when the brain is very concerned about its inability to perform even simple tasks because it is running an energy deficit, it signals anxiety, literally. Is this confusing for the patient? Very!

I don't believe it is common knowledge within modern medicine that every time there is a demand on the brain, literally a demand for energy, those little energy factories inside nerve cells, the mitochondria, must produce energy. Neuroscience research suggests that the greatest secondary damage from TBI (and I believe all injuries to the brain) is damage to mitochondria.

"TBI pathogenesis is biphasic; it entails both a primary mechanical injury and secondary delay injury mechanisms. The primary injury is initiated by the acute mechanical disruption of brain tissue and cellular architecture. The mechanical injury damages axons and synapses leading to excitotoxic injury, while tearing of blood vessels results in both hemorrhagic and ischemic injury. Secondary TBI injury is delayed, developing hours-to-weeks later. Both injury phases prompt maladaptive mitochondria-specific lipid oxidation, inflammation, and initiation of regulated death pathways." [5].

Here is the long-term damage I believe Ms. S has been struggling with for many years. Thankfully, she has been able to articulate her experiences in her treatment, thereby giving both of us a better opportunity to understand exactly what she struggles with.

Exploring this issue further, the universal issue with all my brain injured patients is chronic fatigue. And I believe this is the explanation: demands on an injured brain create a deficit with the mitochondria's ability to produce the energy necessary to meet these daily demands. It then takes more energy to find new pathways in the brain, and this slows down the process of assimilating and responding to life. With many of my brain injured patients, there are often long pauses before they can respond to answering questions. These pauses (because the brain is having difficulty assimilating and processing information), along with chronic fatigue are the basic impairments I have found that brain injured patients struggle with.

Let's take a closer look at the neurological damage caused by trauma to the brain, something I believe Ms. S has been experiencing for many years, eventually leading to her blackout problems. Note that brain cells have high metabolic needs such that uninterrupted energy supplies from functional and healthy mitochondria are essential for normal functioning of the brain. Damage to the brain can cause cell death (of the neurons) through either one of two interwoven processes: necrosis and/or apoptosis. Necrosis usually occurs when there is damage to the brain from an external source, and/or a decrease in blood flow (this is the cause of a stroke or cerebral vascular accident, now the second leading cause of death in the world). In addition, inflammation occurs when a cell dies, causing increasing injury to the varies surrounding cells and organs.

No wonder then that this is a neurodegenerative disease process. Apoptosis is programed cell death caused by certain biochemical changes involving the cell. Together these processes are what constitute secondary damage to the brain, and then ultimately to the mind as well.

This, then, is the damage to the brain/mind that Ms. S is struggling with, but which over the course of her lifetime has not truly been recognized. And yes, she has suffered enormously because medicine did not recognize this for her.

In researching literature on trauma to the brain and chronic fatigue, the kind that Ms. S has been experiencing for many years, identifying damage to mitochondria as a serious consequence of these kinds of injuries, has a well-researched path. But I have seen no evidence of the clinical manifestations of this connection anywhere in my work territory. I note the following from an article published in 2012 where the authors point out that a TBI "is a complicated pathological process that consists, of primary insults and a secondary insult characterized by a set of biochemical cascades." [6]. (Also see my model, The Complex Architecture of Traumatic Brain Injuries in Figure #1 for more details about this neurodegenerative process.) The authors continue to explain this connection: "The imbalance between a higher energy demand for repair of cell damage, and decreased energy production led by mitochondrial dysfunction aggravates cell damage. At the cellular level, the main cause of the secondary deleterious cascades is cell damage that is centered in the mitochondria. Excitotoxicity, Ca overload, reactive oxygen species (ROS), Bci-2 family, caspases and apoptosis including factor (AIF) are the main participants in mitochondrial-centered cell damage following TBI." [6].

Back with Ms. S.

(D) "Then what happens to you when you get to the grocery store. What is that experience like?"

(P) "Well, I'm already in a panic! So, things just become more and confusing. I can't remember what item I'm looking for is on what isle. Then I start to panic more, because I think people are beginning to look at me because I look pretty crazy wandering the isles aimlessly. But I truly can't find what I'm looking for, so I keep going on like a crazy person."

(D) "At this point in the grocery store are you starting to get scared?"

(P) "Yes, because I'm afraid I'm going to be arrested by the Police for acting so crazy! And then never allowed back in that grocery store again."

(D) "At that point, you decide to leave because you're having a panic attack?"

(P) "I was having a panic attack, so I decide to take the 5 items I had in my cart, not the 15 items I came to the store for, and get out of there as fast as I could."

(D) "You managed to do that?"

(P) "Thank God no one else was at the checkout counter when I went to check out."

(D) "And you managed to exit the store with no problem from there?"

(P) "I did but by then my hands were shaking so badly that I could hardly hold on to the grocery bag. Miracle of miracles, I managed to make it out of the store and got into my car without dropping anything."

(D) "How was driving home?"

(P) "Pretty shaky. White knuckling it all the way. I could barely keep my hands on the steering wheel. But I made it home okay."

(D) "Did anything happen once you got home?"

(P) "By the time I got into the house I was on the verge of a major black out. So, I threw my groceries in the fridge and went to lay down on the couch."

(D) "Did you fall asleep at the that point?"

(P) "I did for about 2 hours and then I woke up with a headache."

I see this pattern over and over again with my patients who are experiencing a brain injury, whether from a TBI, a stroke, seizures, infections in the brain, major mental illness, PTSD and Complex-PTSD or some combination of these. These injuries rob the brain of energy very quickly, and this condition usually continues to get worse, especially without treatment. Overall, trauma to the brain can affect all neuronal processes of cellular respiration and bioengineering. This is a very broad and at the same time very powerful statement.

Again, I return to the perspective that understanding the damage to the mitochondria (over a long period of time for Ms. S) plays a major role in the kinds of difficulties she is experiencing. Note the following which supports this understanding:

"Mitochondria are essential for neuronal function because they serve not only to sustain energy and redox homeostasis but also are harbingers of death. A dysregulated mitochondrial network can cascade until function is irreparably lost, dooming cells" [5].

"The secondary injury of TBI persists chronically even after the amelioration of the initial acute phase. The consequences of secondary TBI poses a heavy individual and societal burden" [5].

"Restoration of mitochondrial function after TBI is necessary to preserve cellular energy production and redox homeostasis. However, preserving mitochondrial function following TBI is challenging due to the interaction between the multiple converging pathways that each cause and feed-forward into dysfunction [5].

Then things got way worse for Ms. S:

(P) "Dr. R I did something very stupid last Friday. I threw an expensive vast on my dining room table into the wall and shattered it into pieces. After that I just collapsed on the dining room floor and blacked out for about 15-20 minutes. When I finally came to, my body was completely paralyzed. That was really, really scary for me. I thought I might be paralyzed for the rest of my life."

(D) "When were you finally able to move?"

(P) "I don't know exactly, I was in such a daze. Finally, I found my phone and called my neighbor to come over and help me. She helped me get back on my feet and then cleaned up all the glass, which was everywhere. I know she was wondering what the hell happened here!"

(D) "What do you think was happening in your brain?"

(P) "It's like I have said before. My brain just gets on fire! This is what it feels like to me."

(D) "And what do you think is the trigger for all this? What do you think led up to your brain "catching on fire?"

(P) "I was pissed off at these men I'm trying to date. It's like I have to babysit them all the time. And then I have to worry about whether or not they are addicted to some stupid substance. You're right I had reached a moment, when I was so pissed off……."

(D) "Did throwing the vase against the dining room wall give you any kind of relief?"

(P) "When I get to this point, when my mind is traveling 1000 miles per hour, I literally can't stop my actions. I just react."

(D) "It's like your brain just explodes, and you have to get rid of the tension somehow?"

(P) "Maybe…… I just know I can't control anything at this point. And now that we're talking about this, I think the issue for me is when I feel that everything is getting out of control, with these idiot men, I really lose it at that point. I really hate when things are getting out of control, because this is how I grew up with an alcoholic mother who was constantly unpredictable and out of control.

Discussion

How do we understand what happened to Ms. S, and what can be done such that she won't have a repeat of this kind of episode? It is clear to me, and I believe the research literature regarding the role of mitochondria following damage to the brain underscores this perspective, that understanding the role of energy in the brain is crucial. What I see with all my brain injured patients is their struggle with energy and motivation, both of which are compromised because of trauma to the brain/mind. I concur with the perspective that the brain will attempt its own healing process (see the 4 Architecture Model in Figure #1), but not successfully so. As this model points out, damage to the brain creates a neurodegenerative progression that will end up in some very series places, especially without treatment. There needs to be intervention here on a wide scale, because we all sustain our lives through the mechanism of our brain/minds. When injured and damaged this affects literally every aspect of our existence. And this is why, in my experience, recovery needs to be a full-time endeavor. Yes, this creates major problems if you need to work to survive. Because work demands energy through the mechanisms of your brain/mind. Then where does this energy come from if its source (the brain/mind) has been compromised through injury, illness, and/or disease? And if you are working (especially at a demanding job), you are literally taking energy away from the healing process. This is a very difficult dilemma to work with.

Below is the protocol I have designed to work with all of this. And, yes, it is hard work for both the patient and the clinician.

Protocol Individualized for Each Patient

Supplements for the brain (rather than drugs which just treat symptoms). I am aware that some drugs can be helpful to patients on a short-term basis.

Stimulation to the brain/mind (I prefer music. See www.stevenhalpern.com some incredible music for healing.)

Total immersion in the healing process with a structured schedule every day, that includes working with art every day.

The development of "flow experiences" which decrease demands on the brain so necessary for healing.

Scheduling neuro-psychoanalytic sessions 1-5 times per week.

Chiropractic sessions to promote the healing of the nervous system.

Exercise each day (stay within your limits and build back your strength slowly).

Eat healthy all the time!

Conclusion

My experience with patients suffering various traumas to the brain/mind (including TBI, strokes, seizure disorders, brain illnesses and diseases, major mental illness, and PTSD) has led me to an important conclusion: that we must pay attention to what is individually taking place in the brain/mind of each patient. Drugs and techniques to stimulate the brain are not enough to promote healing and recovery. It's the patient-doctor relationship that provides the context (the matrix/holding environment) for healing to occur. As in the example above, getting to know Ms. S and her ability to share her experience with the "perfect storm" in the brain is what provides the context for healing and recovery. Through our relationship it became possible to understand and treat the effects of stress on her recovery. Once we understand how stress drives a TBI, and its effect on energy regulation, it becomes possible to pinpoint what is needed in the patient's healing process. That is, getting to know the experience of her brain trauma, be this TBI, stroke, seizure disorders, infections in the brain, brain illness and disease, major mental illness, and PTSD, is the key.

Finally, there is increasing neuroscience understanding that mitochondrial dysfunction is a major contributor to neurological disorders such as Alzheimer's Disease, autism, schizophrenia, depression and I would add TBI and strokes to this list. Synapses need a lot of energy to stay connected and to be able to filter and process the information that is constantly surrounding us (and increasingly so in the 21st Century). When this system of energy within the nerve cells is not working properly, it disrupts (at times very seriously) the functional capacity of cell-to-cell communication channels (the neurological pathways in the brain). This then results in problems with thinking, memory loss, problem solving, attention, focus, concentration, sensitivity to light and sound, anxiety and depression, and the management of stress (as

we saw with Ms. S). And repairing damage to the mitochondria is one of the key factors in recovering from the various forms of trauma to the brain/mind [7].

References

1. Leighton J Reynolds. Exploring the Physical and Emotional Damage Legal Proceedings Cause Traumatic Brain Injury Patientsin Traumatic Brain Injury Challenges Edited by Loannis Mavroudis and Alin Ciobica. InTechOpen. 2024.
2. Mark Solms, Oliver H Turnbull. What is Neuropsychoanalysis. Neuropsychoanalysis. 2014; 13: 133-145.
3. Jack Panksepp, Mark Solms. What is Neuropsychoanalysis Clinically Relevant Studies of the Minded Brain in Special Issue of Cognition in Neuropsychiatric Disorders. 2012; 6-8.
4. Brian Johnson, Daniela Flores Mosri. The Neuropsychoanalatic Approach Using Neuroscience as the Basic Science of Psychoanalysis in Frontiers in Psychology. 2016; 7: 1459.
5. Andrew M Lamade, Tamil S Anthonymuthu, Zachary E Hier, et al. Mitochondrial Damage & Lipid Signaling in Traumatic Brain Injury. Exp Neurol. 2020; 329: 113307.
6. Gang Cheng, Rong-hua Kong, Lei-ming Zhang, et al. Mitochondria in Traumatic Brain Injury and Mitochondrial-Targeted Multipotential Therapeutic Strategies. Br J Pharmacol. 2012; 167: 699-719.
7. Meenakshi Ahluwalia, Manish Kumar, Pankaj Ahluwalia, et al. Rescuing Mitochondria in Traumatic Brain Injury and Intracerebral Hemorrhages A Potential Therapeutic Approach. Neurochem Int. 2021; 150: 105192.