Brain Damage: Infections And Toxins And You, Oh My! Transcript

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Introduction to Infection-Related Brain Damage

– Hello everyone and welcome to the Microbes and Mental Health Summit. I'm your host Dr. Miles Nichols. Today to talk to you about brain damage and no I'm not talking about taxes or a problem child, all the latter problem child actually may be caused by these same issues. I'm talking about infections and toxins and you.

Oh my because infections and toxins can actually cause either neuro inflammation that can damage the brain and or can initiate an auto antibody attack against your own brain tissue meaning you your own immune system attacking itself. That's the you.

So we're talking here about a post-infectious brain autoimmunity and the research that supports infections as a cause for health, mental health and brain imbalances. And there's research that support the link between infections in brain alterations. This research study infectious disease associated encephalopathies in self allot of who encephalopathy is an umbrella term for brain dysfunction.

Either structural and or functional issues with the brain.

How Infections and Toxins Trigger Neuroinflammation

So it includes a lot of different things and we're focusing in on the infectious triggered encephalopathy. Today the structural the functional insult to the brain. In some of the other talks I've talked about other ways in which brain can be damaged but this really infections toxins we see can contribute to systemic inflammation that can contribute to issues with the blood brain barrier. Just like you have an intestinal barrier that is supposed to prevent toxins and bacterian things from getting through the gut lining and it's supposed to just transport these proteins, these protein transporters taking your nutrients, your immuno acids in.

But if the blood brain barrier in the brain which is supposed to prevent infections and bacteria and toxins from getting into the brain becomes disrupted, then we see these inflammatory proteins and other toxins and chemicals can get into the brain and contribute to neuro inflammation or brain on fire.

Also, these things in the brain called microglia, it's part of the immune function can become activated trying to deal with this inflammation that then can increase more inflammatory proteins and worsen the issue. And astrocytes, which are involved in memory involved in brain function can become dysfunctional as well and that then can lead to neuronal degeneration that can lead to cognitive impairment.

Alzheimer's dimension mental health dysfunction as well. So infections can trigger encephalopathy and then lead to brain function and structural problems that can then manifest as mental health issues like depression, anxiety or cognitive impairment and decline.

But how how defections, infections trigger brain dysfunction.

Blood-Brain Barrier Breakdown and Brain Cell Dysfunction

one way is directly by actually entering the central nervous system and entering the brain infection. Some of them can directly do that. We know that for example, streptococcus group B causes strep infection sometimes in the throat, can also sometimes actually get into the brain directly causing issues and encephalopathy.

Other ways are indirect where bacteria viruses, parasites can create inflammation the whole body that can then lead to disruption the blood brain barrier and neuro inflammation in the brain, they also infections can sometimes the protein structure look a lot like the protein in structures of the brain so that you actually can get a autoimmunity across reactive auto immunity or the immune system is trying to deal with the infection. But it just so happens that

brain structure like a dopamine receptor looks a lot like that line back to you.

And so there's that cross reactivity where the immune system inadvertently is attacking dopamine receptors leading to neurotransmitter imbalance, leading to brain dysfunction, mental health problems and even potentially to cognitive decline, infections and microbes can also produce neurotoxic compounds themselves in fact in the cell wall of gram negative bacteria or polysaccharide or LPS that can be considered an endo toxin themselves, they can create that systemic inflammation and lead to that neuro inflammation, interestingly in the gut talk, I talked about how mice it got their vagus nerve cut lost the benefit from a probiotic bacteria in the gut that was regulating the stress response and some of the neurochemistry in the brain cutting the vagus nerve also actually eliminates the negative response to end a toxin.

If you inject a toxin to people and the animals, they get very sick, very ill and they express changes in brain function and behavior.

How Infections Cause Encephalopathy

But if you cut the vagus nerve, they don't. So there's some impact of neurotoxic compounds on the vagus nerve that impacts brain function. Here's the pathway first, peripheral infection from bacteria from viruses from parasites Second leading to systemic inflammation that trickles into neuro inflammation that creates changes in the cellular physiology. Third that leads to memory problems.

Learning issues, anxiety, depression, cognitive and behavioral impairments and what we call microglial priming says microglia are primed to lead to being activated and creating more and more destruction in the brain of even neurodegenerative disease, cognitive impairment. Alzheimer's dementia.

So how do you know if you have encephalopathy? What are some of the signs and symptoms? Well these things aren't caused just by encephalopathy. Of course there are many causes for these things but these are all possible expressions or signs or symptoms of encephalopathy. You don't have to have all of them.

Just one of them in many cases in other cases a couple of them anxiety, depression, obsessive compulsive disorder or OCD Sleep problems, ticks or other motor problems or symptoms difficulty concentrating. ADHD. Eating disorders, cognitive decline or impairment developmental regression.

People going backwards in their development, aggressiveness or behavior regression. This happens in children. We talked about a little bit jokingly about problem child at the beginning but actually in all seriousness there's even a pediatric acute onset neuropsychiatric syndrome is a name for something called pans or pandas.

That happens frequently in children where after strep infection or after mono or after certain other infections. There's a behavior change and it can happen suddenly it sometimes is right after infection sometimes can be months delay.

Sometimes a year delay.

Signs and Symptoms of Encephalopathy

So sometimes it's hard to pin back to the infection of the source but it's been conclusively shown in research that infection can lead to this auto antibody response against brain or any of the other mechanisms we've talked about this encephalopathy that can change the child's behavior.

They can become more aggressive. They can seemingly have learned some things about social skills and then go backwards. So behavior or aggression aggressiveness are two big signs to watch out for, especially in Children and not only doing disorders but also food sensitivities and then sensory sensitivity becoming overly sensitive to light to sound to stimulus, urinary urgency and frequency. These are all signs and symptoms.

There are more, but those are some of the main ones that we see with encephalopathies. So what are the

mechanisms for how infection can go through this process of creating from the time of infection? This dis regulation in the brain.

We've talked about this to an extent. So this is just an overview the inflammation caused by the viruses, bacteria or parasites. If out of balance leads the blood brain barrier dysfunction can cause neuro inflammation can lead to those cognitive behavior impairments but which infections specifically have been shown in research to actually be able to in some people trigger encephalopathy. Well, a bunch of viruses, Herpes simplex virus and other herpes viruses, Epstein Barr virus that causes mono, various strains of influenza or the flu human immuno deficiency virus HIV, cytomegalovirus virus, SARS Cov COVID-19 and the other SARS viruses and more more viruses than I even was able to list here parasites as well. We have Babesia which is malaria like parasite that sometimes considered a co infection of Lyme disease.

It also it's tick born so you can get it in a tick bite and it can become chronic.

Infections Linked to Brain Dysfunction

In some cases it can trigger mild encephalopathies that can become chronic over time. A lot of people don't know that they have a mild encephalopathy. Unfortunately toxoplasma is a parasite that can change behavior we know in mice. It changes behavior too irrationally.

Fear not fear cats and even be attracted to their urine. It's a very strange thing because the cats are the host for that parasite in humans. It can also trigger inflammation encephalopathy in the brain.

There are several other parasites and a bunch of bacteria borrelia burgdorferi. The bacteria causes Lyme Barton L. A. Is what causes cat scratch fever.

It's also considered one of the Lyme co infections and it can be gnarly for a long term and significant encephalopathy streptococcus we have as one of the big ones that can cause encephalopathy. Kiebsiella pneumoniae, the bacteria that I test people's gut and see collapse yelling.

They're not infrequently also see strep in there, not infrequently and I see antibodies against mycoplasma pneumonia which is another one of the bacteria pretty frequently in people.

So these all are bacteria and there are more as well that can and have been shown in research to trigger encephalopathy. For some people, the pathogenesis is this blood brain barrier dysfunction is micro glial activation, this astrogliosis, this neuro degeneration and this neurotransmitter system dysfunction as a result of all of that.

So as these inflammatory side of kinds get into the brain, the microglia get activated and calling more inflammatory cytokines and chemokines, increased reactive oxygen species and create oxidative damage in the brain, destroy and dis regulate the astrocytes that decrease neurotransmitter recycling that lead to neuronal degeneration and brain issues.

There are some non infectious causes as a broader context for encephalopathy. Not going to go into details.

Non-Infectious Causes of Encephalopathy

Just gonna tell you that organic toxins like mycotoxins from mold toxins from bacteria can be a cause inorganic toxins like toxic metals and organophosphates, pesticides, chlorine, some chemicals can be a cause electrolyte imbalance can be severe. Too much sodium, too little sodium.

Same with calcium, magnesium, some drugs including antibiotics. Sometimes there's a post antibiotic encephalopathy. Anti nano plastics, antidepressants. Even if strong can create encephalopathy and antipsychotics.

Hashimoto's thyroid autoimmune disorder has been shown strangely and without a lot of understanding as to fully why that it can induce encephalopathy in some and metabolic and mitochondrial dysfunction, which metabolic

syndrome is ubiquitous.

It's huge. It's significant today, mitochondrial dysfunction is not uncommon. These can also trigger encephalopathy. So how do we test how do we know because you may not have the symptoms, you might have anxiety, you might have depression, you might have one or more of these issues and you might want to know could encephalopathy be the case? Is there actual brain structure or function changes aside from that symptom picture? What do we look for in terms of lab testing for causes? Well, when it comes to encephalopathy, we can actually look at neurologic antibodies, we can look at antibodies against brain structure and tissue. We can measure those and see do we have any antibody against dopamine receptors in the brain against tubules in the brain?

And so the neural Zoomer plus by vibrant wellness or the Cunningham paddle by molecular era are good panels that can look at antibodies against brain tissue.

Testing for Autoimmunity and Infection Triggers

We can see do we have that autoimmune type of encephalopathy occurring and a tick borne infection with co infections panel that can be one that's also by vibrant wellness is a good one. And I gen x has a good tick borne testing and a few other labs and this can really look at antibodies against if you've been exposed to Lyme disease or some of those co infections like babesia and Barton nella and mycoplasma and then mole talks and and chronic inflammatory markers can be tested for gut testing. Methylation testing mitochondrial function testing metabolic markers for a broader context on the things that can be at the root of encephalopathy.

So that's what we'll be exploring today. And we've been exploring through this summit is the good, the bad and the ugly microbes as they relate to brain function, in particular, the focus here today, and in many talks in this summit are going to be infections and pathogenic microbes and viruses and bacteria and parasites and how they can initiate this process. The environmental toxins like mold and chemicals and metals and the auto antibodies against brain structure to enjoy today's talks, I'm your host Dr. Miles Nichols with the medicine with heart functional medicine clinic.

Thanks so much. Have a great day.