NATIONAL HEADACHE FOUNDATION
HEADWISE™
PODCAST

Episode 247: How Blood Sugar Impacts Migraine (And What You Can Do)

Lindsay Weitzel, PhD:
Hello everyone, and welcome to HeadWise, the videocast and podcast of the National Headache Foundation. I'm Dr. Lindsay Weitzel. I have a history of chronic and daily migraine that began at the age of four. I am excited to tell you that I am here today with Dr. Laurel Short. Hello, Laurel. How are you?

Laurel Short, DNP:
I'm great. Thank you.

Lindsay Weitzel, PhD:
Laurel is a nurse practitioner with Advanced Qualification in Headache Medicine [AQH©] who happens to be a dedicated endurance athlete and loves talking about wellness and its relationship to headache and migraine. She is a repeat guest, and we had so much fun with her last time, and she did such a great job that I asked her to come back.

Today we are going to discuss some aspects of nutrition related to migraine, particularly blood sugar. And I think that everyone loves this topic. Everyone always has questions about it, they comment about it, so I'm hoping that everyone can get something about out of this episode. Laurel, let's start with a general question. I think when we say blood sugar and migraine a lot of people think of regular meals, snacking, whether or not we eat sugary foods versus high protein, etc. Is it more complicated than that?

Laurel Short, DNP:
Yes and no. I think the practical advice we're going to go over, at the end of the day all circles back to simple methods to keep blood sugar stable. However, there's some newer research and theories that we're going to touch on today that get a little more scientific in blood sugar regulation. And I do think for most people, it can help to understand how eating carbohydrate, which all carbohydrate is converted then into sugar. So, whether we're eating a piece of birthday cake or a bowl of rice or some pasta, those are all different forms of carbohydrate. Fruit is carbohydrate. And so, kind of being reminded if it's been a while or maybe for the first time for some people, understanding how that then affects our cells and our insulin production. That can be helpful to then understand why we're making recommendations of eating a certain way.

Lindsay Weitzel, PhD:
You mentioned insulin. I think that people have been, I've heard people. I've watched them. They're paying so much more attention to insulin and things like this now. So, does insulin itself play a role in migraine and head pain?

Laurel Short, DNP:
So, it may. That's where some of the new research and theories are going. And we know that migraine is a complicated process in the brain. I'm sure you've had other guests that have talked about the different nerve chemicals involved once a migraine is triggered. But it seems to be that insulin and blood sugar levels could possibly be one of the key players in the trigger of a migraine attack, and possibly even how we see progression from episodic to chronic migraine, that how insulin is acting in our body could be a factor in that.

But to back up a little bit, for decades it's known that low blood sugar or hypoglycemia is known to be a headache trigger. And most people intuitively know that. Whether they get full migraines, or simply a headache from lack of eating, most people intuitively know if they go too long without eating, they might get a headache. And we've known that for a long time. However, there's also some terms that I think folks might not be as familiar with, including insulin resistance and then how that ties into the newer theories that we're starting to hear about.

Lindsay Weitzel, PhD:
So, you are sort of guessing, it looks like you're guessing what I want to ask. So, we do sometimes hear the names of newer theories or phrases. Sometimes they might be buzzwords out there like "neuroenergetic" hypothesis of migraine. So, in general, what does that mean?

Laurel Short, DNP:
Actually this is a newer term to me too. So, before we dive into that, the "neuroenergetic" hypothesis of migraine, let's do a brief review of how insulin works in the body. Insulin is a hormone that comes from the pancreas. And so, when we eat carbohydrate, again that can be a banana, rice, donut, anything that is carbohydrate that is then converted into blood sugar, in order for that blood sugar to get into our cells and to be utilized for energy, we have to have insulin to unlock the cells. So, the pancreas releases the insulin. The insulin is what unlocks the cells for the blood glucose, carbohydrate, sugar, all those terms are interchangeable, for it to get into the cells to then be utilized.

Some people have what's called insulin resistance, which means when they eat and their body pushes out the insulin from the pancreas, their cells don't respond as easily as someone without insulin resistance. And therefore, the pancreas has to push out more insulin because their cells are resistant to insulin. So, when you hear the term insulin resistant, it means that person is wired in a way that their body doesn't respond as efficiently to insulin. And over time the pancreas can get fatigued, and that's what sets that person up to be more at risk for type 2 diabetes. Interestingly, though, before you even were to develop prediabetes, we can look for insulin resistance by testing someone's fasting insulin. So, I'm curious if you're familiar with that? Have you ever had that tested for yourself, your fasting insulin?

Lindsay Weitzel, PhD:
I feel like I haven't. I think that they automatically run the glucose testing and things like that. And they recently did that in my son with some of his headache testing. I'm trying to remember, maybe the insulin was in there, but it just didn't stand out to me. I'm trying to remember.

Laurel Short, DNP:
So, for anyone listening, if type 2 diabetes runs in your family, or if you feel like you're maybe extra sensitive to, or you go too long without eating, or certain foods seem to trigger headaches, that's a lab you could actually ask to have tested. It's more standard to do what's called A1C, which is the average of blood sugar over three months. But you can also test fasting insulin. And that gives us really good information even before it impacts your A1C. And that can just be helpful information to then move forward and say, okay, well how can I then modify some of my nutrition to help with that.

Lindsay Weitzel, PhD:
I like to give people a chance to comment on whether they feel like they're particularly triggered by fasting or not having a chance to eat their lunch, or if they've asked their practitioner to run these types of labs before. Go ahead and comment if you've done that. So, let's go ahead then. Now that we have this background, this information, can you talk to us about this newer hypothesis out there, the "neuroenergetic" hypothesis of migraine?

Laurel Short, DNP:
This hypothesis is basically saying in addition to going too long without eating, which we know as a drop in your blood sugar, that for some people after they eat, we get that insulin that helps us absorb the energy. But then after that you can get another drop in your blood sugar. So think about the concept of, well, if I eat, say only a donut for breakfast or only a bowl of cereal and I don't have protein with it, 1 or 2 hours later, you might feel kind of shaky. You might feel lightheaded. That's because you got a spike in your blood sugar, and then it dropped again. So, the medical term for that is postprandial hypoglycemia. That's fancy for after you eat, your blood sugar drops.

So, this new theory is saying that drop in blood sugar after eating could potentially be a trigger for a migraine attack. And that over time, I already talked about insulin resistance and how that can affect really all the cells in your body, that insulin resistance also affects the brain. And they're specifically referring to that as brain insulin resistance. We know that our brain needs a lot of energy to perform. And so, this theory is saying that over time if you have insulin resistance affecting your brain, could that be a factor in your migraine progressing from episodic to chronic. So, we don't have black and white evidence for this at this time. It's more in the theoretical stage, but it makes sense to me as a clinician and how we think about blood sugar, blood sugar management, that it could be a factor.

Lindsay Weitzel, PhD:
I find this very interesting. It's not something everyone knows about or has thought about, and it still is in the hypothesis phase. It is a theory. And we always like to point out that not everyone is the same, not everyone's migraine is the same, but it is very interesting. Do certain sugars or foods we eat get converted to glucose more efficiently? And how can that affect our chances of getting a migraine, etc.?

Laurel Short, DNP:
Yeah. There are different forms when we talk about carbohydrate. And sometimes we use the term simple carbohydrate and complex carbohydrate. Or are you familiar with the term glycemic index? I will say that some foods have a high glycemic index versus a low glycemic index. So, I think the simplest way to think about it is the simple carbohydrate versus complex carbohydrate. And in order to keep blood sugar stable, you want to aim for more complex carbohydrates. So that would be things like whole grains, fruits, especially berries, legumes. So, if you think lentils, beans, these are all types of carbohydrate that when we eat them, they take longer to digest. And when they take longer to digest and be absorbed, that's going to keep your blood sugar stable versus if I have a simple carbohydrate.

So let me use the example of just a piece of white toast. If I have just a piece of white toast for breakfast, I'm going to digest that very quickly. Now that might be great before your run. I know you're a runner, so if you need something quick to give you energy before exercise, that's perfect. So, some of this is about timing. But if it's hey, I'm getting ready to go to work, I know I'm not going to have a chance to eat for a few hours. I want to have a more complex carbohydrate. And then in a few minutes, we can talk more about pairing that with of other types of nutrients as well. But if we're talking just about carbohydrate, if we're trying to keep our blood sugar stable, you want to aim for a more complex carbohydrate or the other term you might hear is something that's a low glycemic index.

Lindsay Weitzel, PhD:
How often do you think someone who's prone to migraine should have a meal or a snack then?

Laurel Short, DNP:
I would say this could apply to anyone, not just people with migraine, to just feel your best and keep your energy stable. But especially people with migraine, because we often say if you have migraine or frequent headaches, you have a more sensitive system in general, so there try to control what we can. So, when we think about how long it takes for food to digest and just normal insulin production and reaction to insulin, you want to aim for having a full meal every 3 to 4 hours.

Now a lot of people are just in the habit maybe of skipping breakfast or working through lunch. And what happens is if you do that for a while, you get less hunger signal. Your body just naturally downregulates its hunger signals, so you may have to prompt yourself to get back in the habit of eating three times a day. But for most people, especially if you have migraine, I would recommend eating three proper meals spaced out 3 to 4 hours, so breakfast, lunch and dinner. And then depending on your schedule, having some snacks in between if you need to keep your blood sugar stable. And that would especially be impactful if you're someone who likes to exercise after work, for example. Think ahead in packing a snack to have before you go to the gym, so your energy expenditure is also going to impact how much you need to eat.

Lindsay Weitzel, PhD:
You had mentioned hypoglycemia earlier, and something I have definitely noticed, is people tend to throw around the terms hypo or hyperglycemia a lot. Do blood sugar levels of people who do not have diabetes or take medications for diabetes typically fall or rise into those actual ranges, or is that sort of a misnomer?

Laurel Short, DNP:
I think that's a really interesting point to bring up, Lindsay. Let's talk first about how these terms would fit with actual lab values. So, hypo meaning low, so low blood sugar or hypoglycemia. If you come in for your annual physical and I'm taking a sample of your blood and testing it, on my reference range, I'm not going to call it true hypoglycemia unless you're under the level 70. So, 70 to 100 is considered a normal fasting blood sugar. And then on the flip side, if you're fasting and we check a blood sample, if you're over 100, we would call that hyperglycemia or an elevated fasting blood sugar. That's in a clinical setting when someone is fasting. However, our blood sugar is not meant to stay in a very narrow range throughout the day. It's meant to fluctuate, so it's normal and expected that your blood sugar will go up after you eat, and then gradually come back down when you haven't eaten.

So, I would say the short answer to the question of how much we need to pay attention to this is getting in tune with your body and noticing how do I feel when I haven't eaten for a while. Or how do I feel after I eat oatmeal for breakfast versus if I have oatmeal plus some breakfast sausage, and kind of pay attention and maybe keeping notes. And this ties in to maybe asking the question of should I be measuring my blood sugar. So, I don't know if that ever comes up or if you've seen comments on that of using a tool called a continuous glucose monitor.

So that's a little monitor that you can wear on your arm for 10 to 14 days. And it uses Bluetooth on your phone, and you can actually watch your blood sugar continuously and see how it responds to meals. I wouldn't recommend using that long term if you're someone without diabetes because it's not necessary. But you could use it short term just to help you get more in tune with how you respond to certain foods and how you feel. It could be a good tool to use short term.

Lindsay Weitzel, PhD:
That does seem like a good idea if you're wondering how much different foods might affect how you feel. I do remember, for example, people talk about eat fruit, eat fruit, and I notice, at some point, that just eating an apple did tend to cause me some issues with my migraine attacks. But if I had an apple and peanut butter, I was okay.

Laurel Short, DNP:
Exactly because you've paired it with something that has some protein and some healthy fat to it. And I think that's such a perfect example. If someone does choose to use a monitor, I wouldn't get too hung up on the exact numbers. Unless of course, it's flagging way out of range then you want to talk to your medical provider. But instead of getting too hung up on the exact numbers, noticing, okay, I ate an apple or a banana by itself, and I kind of shot up for an hour on my number and then shot back down, and I noticed I got a headache an hour later. Versus I had the piece of fruit with some other macronutrients. I do think we're going to see more people using these continuous monitors. They're available over the counter. I would just caution that this doesn't need to be a long-term tool or modality, but it can be very helpful short term.

Lindsay Weitzel, PhD:
You brought up macronutrients, so let's touch on macronutrients specifically. Can too much carbohydrates or sugar cause a migraine or perhaps not enough protein as I mentioned, if you don't mix the two together? Let's just touch on that really quick, how that works.

Laurel Short, DNP:
In general macronutrients refers to carbohydrates, fats, and protein. And when we talk about blood sugar, the first thing that comes to mind is sugar and carbohydrate, because that impacts our blood sugar very quickly. However, having that other macronutrients also impacts what our blood sugar does. And I think the key point that we can remember is whether we're having a meal or a snack, we're looking for balance on our plate. There was actually a study called the healthy plate study that looked at tracking if individuals had balance within their plate, complex carbohydrate, protein, and healthy fats. It tended to reduce the severity and frequency of their migraine. And so, we could conclude that a big part of that is it's keeping their blood sugar stable.

So if you think about having a meal or a snack and creating balance within your plate, having a complex carbohydrate, let's say you have some brown rice or some quinoa or some lentils, and then you have your protein, that could be animal protein if you eat meat, or it could be a vegetable protein like tofu or yogurt, and then adding a healthy fats such as avocado or olive oil. That helps absorb your nutrients and slows digestion to have the healthy fats. Protein also slows digestion and helps stabilize blood sugar. I know protein is a buzzword right now and making sure you get enough protein. For our purposes today, this isn't about weight loss or dieting. We're talking about blood sugar stabilization specific to headache.

Lindsay Weitzel, PhD:
If you were to have an elevator speech on what it takes to keep your blood sugar stable if you're someone who's prone to migraine, what would you say?

Laurel Short, DNP:
If you're someone who's prone to migraine, I would encourage you to get in the habit of starting your day with a good breakfast, including 20 to 30 grams of protein with your breakfast. If you're not used to eating breakfast, just start very simple. You don't have to hit that 20 to 30 grams right away. Maybe start with a protein shake or some peanut butter toast just to get in the habit of starting your day with fueling yourself. And then the other key thing that we can all work on is doing meal prep. Because doing meal prep on your day off, or when you have a little free time, really sets you up for success throughout the week. And this doesn't have to be complicated recipes. They can be simple foods. And really just getting back to creating balance on your plate with every meal and snack.

Lindsay Weitzel, PhD:
Is there anything else you'd like to add to this topic before we go today?

Laurel Short, DNP:
Yeah, a few thoughts. One is, if this is a little overwhelming to you or if you're not quite sure where to go with meal prep and further ideas, look for a registered dietitian in your area. Registered dietitians are wonderful resources. They're clinicians that have master's degrees and are certified. And that's the difference between a registered dietitian and someone saying they're a nutritionist. So, I would look for a registered dietitian. Many take health insurance, and they can work with you to create an individualized plan. And you can think of it as having a coach. And again, this isn't about being on a diet or necessarily weight loss. This is about looking at managing blood sugar to help you feel your best from a migraine and energy standpoint.

But along the lines of weight loss, I think, with this topic, we can't avoid the conversation of GLP-1 medications a little bit. These are very popular medications right now that were developed initially for type 2 diabetes but are being found to also help quite a bit with weight loss, sleep apnea, possibly reducing inflammation and heart disease. So, I think we're at the tip of the iceberg on how much these medications will be used and can have some very positive impact. However, I would just like to say, if you're someone who has migraine and is using one of these medications for weight loss, they can reduce appetite quite a bit. And it's really important to make sure you're not going too long without eating, you're still getting plenty of protein, healthy fats, because you could possibly see an increase in your headaches if you're going too long without eating. And again, I know your appetite might be reduced, but it doesn't mean your body doesn't have that need for fueling and nutrition.

Lindsay Weitzel, PhD:
Thank you so much. That was an awesome episode. I think that everyone learned something, so thank you so much for being here. And thank you everyone for tuning in. Please tune in to the next episode of HeadWise. Bye bye.

Laurel Short, DNP:
Thanks, Lindsay.

Resources:

1. Migraine, Brain Glucose Metabolism and the "Neuroenergetic" Hypothesis: A Scoping Review https://www.jpain.org/article/S1526-5900(22)00039-6/fulltext

2. The Healthy Eating Plate Advice for Migraine Prevention: An Interventional Study https://pmc.ncbi.nlm.nih.gov/articles/PMC7352548

3. Healthy Eating Plate https://nutritionsource.hsph.harvard.edu/healthy-eating-plate

4. Advanced Qualification in Headache Medicine (AQH©) certification https://headaches.org/aqh