EPISODE 35: DIABETES AND OBESITY

Dr. Rita Kalyani, MD: Welcome to Diabetes Deconstructed, a podcast for people interested in learning more about diabetes. I'm your host, Dr. Rita Kalyani at Johns Hopkins. We developed this podcast as a companion to our Patient Guide to Diabetes website. If you want a trusted and easy to understand resource for diabetes, or to listen to previous podcasts, please visit hopkinsdiabetesinfo.org.

Today, we are thrilled to welcome Dr. Marci Laudenslager, who will speak with us about obesity, weight management, and diabetes. Dr. Laudenslager is an internal medicine and obesity medicine physician in the Johns Hopkins Healthful Eating Activity and Weight Program. She's a diplomat of the American Board of Obesity Medicine, and her clinical expertise is in obesity and obesity associated disorders. She received her Doctor of Medicine degree from Drexel University College of Medicine and completed her internal medicine residency at the Hofstra Northwell Internal Medicine Residency Program, where she additionally served as chief resident. She became a Harvard Macy's scholar during her year as chief resident. Dr. Laudenslager received her Master of Health Science degree from the Johns Hopkins Bloomberg School of Public Health and completed her general internal medicine fellowship training at the Johns Hopkins University School of Medicine. Welcome Dr. Laudenslager to our podcast.

Marci Laudenslager, MD, MHS, DABOM: Thank you for having me. It's such a pleasure to be here.

RK: We are so thrilled to talk to you about something that I think comes up very often in our conversations, especially with people with diabetes. And that is the question of weight and what is the role of weight management in diabetes. I thought you could start off by talking about what is obesity? What does that indicate?

ML: The answer to this question is surprisingly nuanced. I can first talk about the textbook definition of obesity, and then we can talk about some of the limitations of our current approach to diagnosis and staging. Obesity is classically defined as a condition of excess body fat, and BMI, or "body mass index", is currently used typically to define and stage obesity. That's calculated using height and weight. It does not at all take into account our body composition. I think professional body builders are a really nice way to highlight this. If we look at, Arnold Schwarzenegger in his bodybuilding days, his BMI was elevated due to that extraordinary amount of muscle mass, but he did not have obesity, which is a condition of excess body fat. BMI criteria first developed using data from white men only. That metric tends to be less accurate for those in other categories of sex, race, and ethnicity. And truthfully, this equation was developed 200 years ago by a mathematician in Belgium. Application of BMI to our modern population really must be done carefully, keeping these limitations in mind There are these limitations to BMI. Yes, it is still useful clinically as a screening tool because it's easy to do. It's inexpensive. Though, BMI should never be used alone when assessing overall health and health risks. For us in our office, we use BIA, or "Bioelectrical Impedance Analysis," and that looks at body composition. The amount of body fat and body muscle. There's that classic definition, and then there are some nuances which limit its use it's really important to take that all into context when defining obesity.

RK: I appreciate you mentioning BMI because it really is the most common marker, that we hear about to define obesity. It's been around for ages, as you've mentioned, but I think we're growing to understand further its limitations. It's a good starting point for a conversation, but it is important to recognize, as you mentioned, that it doesn't necessarily reflect the relative proportion of fat to muscle. And for those who might work out a lot or have a lot of body muscle, it could be misleading. And then conversely for some populations, certain ethnicities, for instance, for Asians, for whom we know BMI cutoffs tend to be a little lower that we might have to factor in the relatively higher percent body fat that is present in some ethnicities. Focusing on BMI, because we know it's the most common measure used, but knowing its limitations as well, what are the categories that are used to define overweight and obesity classically? And why were these numbers chosen? What do they indicate?

ML: If we return to those BMI criteria that is still the most classic definition. If we look at class 1 obesity, that woul hopkinsdiabetesinfo.org d be a BMI generally of 30 to 35 kg/m2, class 2, 35 to 40 kg/m2, and class 3, 40 and greater kg/m2, and then overweight 25 to 30 kg/m2. We still do use those BMI criteria clinically. The thought behind that, I think, initially was to help us understand health risks for folks as body weight increases, but as we've been talking about, this metric is imperfect in many ways. I did want to highlight another way to actually define and stage obesity, and that's by using the "Edmonton Obesity Staging System," or the EOSS, which is something we use clinically. It's also used in research. This is a five stage system that considers metabolic, physical and psychological parameters to both classify and identify appropriate treatments for obesity. This looks at whether or not blood pressure is elevated. Whether or not what sugar has gone up? If there are physical challenges: difficulty getting around; pain with walking; quality of life troubles; affect on mood like depression. It really is a more

comprehensive way of looking at the effect of excess body fat on metrics and other aspects of health. There are those two ways of looking at this. When we use the really quick and easy tool of BMI, we do that as a first glance. It is used in whether or not someone is a candidate for a surgery or certain medications. But really when we're looking at the overall picture of a person. That's what we want to do. We want to look at all of us. We are people, we are not numbers. The Edmonton Obesity Staging System really does capture that a little bit better.

RK: I hadn't heard of that system and it's interesting to hear that you are using it clinically as well. I found it insightful in particular that it incorporates some of the consequences of obesity – it sounds like the metabolic consequences and functional consequences. I wonder if you could talk a little bit more about the complications of obesity, because this is really why we focus on diagnosing it, isn't it? Why do we have to treat obesity? What are the consequences?

ML: One that's particularly relevant to our topic, diabetes, prediabetes, and diabetes, of course, high blood pressure, high cholesterol, heart disease. That's, heart attack, stroke, heart failure, and other things like sleep apnea, fatty liver- that's a very specific liver disorder that's related to higher body fat, especially around the middle section. Where body fat is collecting around your organs. It has this really super long name. The shorter term for that is MASLD, "Metabolism dysfunction Associated Steatotic Liver Disease." It's a disorder of the liver caused by extra body fat collecting around the liver itself. That alone is linked to things like heart disease and diabetes. A lot of these different connections; there are these shared conditions that we often see overlapping.

Those are some of the ones that we talked about, but an excess body fat percentage over time can also predispose to cancer. That likewise is very important breast uterine cancer, as well as cancer of the colon, liver, pancreas, and prostate. A number of health conditions that we really want to be aware of as being associated with that, higher body fat percentage, especially the body fat that collects around the middle or what we call "visceral fat."

RK: It is amazing how many different ways this excess body fat can impact different organs in the body. And I think it behooves us in all specialties, not just my own, endocrinology and, yours, weight management, but really for many people to think about the relationships of obesity with other medical conditions. How common is obesity and, why does this occur? Why do some people seem more prone for lack of a better word to excess weight? And is it something we're born with?

ML: Obesity is projected to affect about 50 percent of adults in the United States by 2030. This really is a truly common and complex chronic metabolic disease. In talking about the causes of weight management challenges, it's so fascinating. Culturally, we're taught that weight management challenges are just about certain aspects of lifestyle. And I think a lot of us are taught that it's just about nutrition and activity. We've heard that calories in calories out dogma for the longest time. And I have to say that that framework couldn't be farther from the truth. Obesity really is a highly complex disease of metabolism. The causes of and contributing factors to weight gain are many.

So, medications. For those who have diabetes, insulin is a great example of this. There are absolutely genetic factors. There's a lot of different factors coming into play. There are certain medical conditions that can cause weight gain and obesity hypothyroidism, Cushing's, polycystic ovarian syndrome.

Lots of different things to consider there. There are socioeconomic factors. Food availability and how our food is prepared in the United States. Ultra-processing and things like that. And then, other things that are less often talked about: fat tissue disorders, adipose tissue disorders, things like lipidemia, which is a disorder where the fat tissue itself grows in an abnormal fashion. These aren't things that we're taught culturally, but these are all of the different nuanced things that can cause weight gain, and of course lifestyle is important, but it goes beyond what we talk about culturally. It goes beyond nutrition and activity, and it includes things like stress, mental health, and sleep, all very important facets of the lifestyle realm.

RK: Thanks for zeroing in on that because I think that the simplification of thinking it's "calories in and calories out" really makes it a challenge to address the breadth of this problem and the complexity of what's contributing to the excess weight. I know that for patients that I see in our diabetes clinic, it's probably one of the most common struggles that I feel my patients share with me. Now talking a little bit more about diabetes specifically, we often talk about lifestyle changes: weight management exercise diet, and it's important. In the management, not only of preventing diabetes and those who have prediabetes, but also throughout the continuum of a lifetime with diabetes. What is the relationship between excess body weight and the development of diabetes?

ML: When we're talking about excess body weight, I think it's important to zero in on that increase in excess body fat in particular. Rather than it being a weight definition, it really transitions to the space of body composition and how body mass is

distributed. And we talked a little bit about abdominal, that belly a distribution of fat. We call that visceral fat. The fat that collects around the organs in particular. When visceral fat is increased, that fat tissue becomes dysfunctional. And that's where we get some of these adverse metabolic effects, like higher risk of heart disease, higher risk of diabetes, because all of those things together take into account the hormone insulin.

I think the one thing to keep in mind is that fat tissue is alive. It is alive in our bodies. It gives off hormones. It responds to hormones. And when that fat tissue becomes dysfunctional, we get into that realm of, insulin resistance. When we're taking an energy, the body doesn't really know what to do with it in an efficient way. The more direct effect of that is a higher blood sugar. And that's why it's so relevant for folks with diabetes. As insulin resistance progresses, diabetes becomes much more difficult to manage, as does body weight. There really is this intimate connection there. We're really looking at, the visceral fat, not that other fat isn't important. It's just that we think about visceral fat when we're talking about disease risk overall and, making sure that body fat that we have is functioning properly. The key messages there are, where is fat distributed and is the fat that we have responding to the other hormones in our body appropriately?

Because once we get into that space of insulin resistance, not only is this highly inflammatory tissue, but, then we get into that space of, blood sugar issues, liver troubles, all of those things are so very much connected to one another. It's a complex question to answer, really, because all of these disease states that we're talking about share hormones in common, and I think that that's an important thing to remember that our body connects all of these different things.

They seem separate, Diabetes, blood sugar control, liver health, body weight, they are absolutely all connected though because they share hormones in common essentially.

RK: And you mentioned insulin resistance, which I think is a central part of this. The fact that obesity can lead to insulin resistance, particularly fat tissue and be related to the development of type two diabetes in particular. And then the constellation of other insulin resistance related problems such as liver disease and other diseases that we see in the body. I wanted to ask a little bit more about the central adiposity that you talked about, because I think that's an important concept, the fact that even if your body mass index puts you in a normal range, that you could still be at a higher risk of developing metabolic disturbances, such as, as diabetes.

I wondered if you could talk a little bit about waist circumference. Is that something that you measure in your clinic? What is the role of central adiposity, the accumulation of body fat in the central region in the development of a metabolic disorder such as diabetes?

ML: When it comes to waist circumference, we can absolutely measure that clinically, but it's important to know that that's for me anyway, my clinical practice, not a standalone measurement. That's something that we would track through time. And I think, especially for folks who are working on physical activity, sometimes we're not seeing those changes in the scale necessarily, but you are seeing changes in your body composition. And while we can Measure that with the tool that we talked about a little bit earlier with the biological impedance analysis, being able to just track other body measurements, waist circumference is one of them, but you can also track other things, sort of, your arm and leg circumference. How that measuring tape wraps around those areas. One thing to keep in mind is that It's a little bit difficult to get accurate measurements in that area. It has to be taken at the same place each time over time. Understanding the limitations there, but generally speaking, I think it can be nice feedback for folks who are working in the physical activity space to see their body composition changing.

You know., "Hey, my clothes fit differently. I went down, a pant size" or something like that. That can also be matched to changes in waist circumference. In looking at, what that all means, I like to use the the the, the liver as an example for this. When we look at visceral fat, really what's happening is these free fatty acids in the body are being released in a way that's a little bit abnormal. And if we look at the liver in particular, then the liver is seeing fat from two places. It's seeing fat from the viscera, around the organ itself, and subcutaneously, under the skin. All of that puts pressure on that organ to manage what it's being given. When we talk about insulin resistance, it's important to know that there are lots of different organs that play a role in that we're getting this increase in sort of free fatty acids. You can just think it as about it as fat delivery to places like the liver, the blood vessels, the pancreas, the muscle, and all of those things work together to maintain a healthy blood sugar and a healthy weight. When we have excess fat in the midsection, all of those different other organs are also being affected.

All of that over time can make blood sugar challenges I think even more difficult to manage clinically for folks who struggle with diabetes, especially. But, if we talk about the blood vessels, you get constriction of those. That can lead to things like high blood pressure, the blood vessels clamp down a little bit more easily. They don't relax as well. Thinking about how dynamic our, our body fat is, especially the body fat around the midsection, I think is especially important for a bunch of different reasons.

RK: Yeah, we didn't really talk much about the cardiovascular complications of obesity, but especially as you mentioned, the accumulation of body fat in the central section around the waist in particular, there is very good evidence for many studies that

that can be related to cardiovascular disease, the development of another condition that we call metabolic syndrome as well. Just even more reasons to think about addressing this in clinical practice. As we're talking about the assessment of obesity, I wonder if you could briefly touch upon race/ethnic considerations in cutoffs that are used for BMI and then also waist circumference. Is it a one size fits all for these diagnostic criteria?

ML: That is such a complex nuanced question, and those statistics are dynamic as well. If we look at, what is the current prevalence of obesity in the United States, and we can compare that to what's projected. Right now, the overweight classification is around about 30%. And with obesity, that BMI of 30 kg/m2 and above right now, that's 42 percent with 9 percent of folks falling into obesity class two or three. A BMI of 35 or greater. When we look at, "is this a one size fits all" set of statistics, the short answer to that is no. There really are racial differences, ethnic differences, differences with gender.
If we look at men and women, for example, assigned gender at birth, the prevalence is generally higher in men for all obesity classes. But, when we look at class two and greater, that's women that are more affected by that. In terms of some of the racial and ethnic differences, obesity is more prevalent currently in non-Hispanic black persons; 2nd, down the line, Hispanic persons, and then Caucasians. To make this even more complicated when you're looking at men and women within those racial and ethnic subgroups, things start to change around a little bit. It really does vary. But I think, one of the important things that came out of a really important New England Journal article by Ward in 2019, that was the one that said, "with what's projected for obesity, that is going to be 50 percent of Americans by 2030." that article went further to say that, class two to three obesity will be the most common BMI category amongst women, non-Hispanic black adults, and low income adults as defined by a household income less than $50, 000 per year. And there was significant variation by state I think when we look at gender, age, racial and ethnic differences and how we see obesity in these areas. It's important to look at socio economic factors or whether or not some things are surrogate markers for some of that stuff. We may talk about this in the landscape of medications, but really effective medicines for, for diabetes and weight management can be quite expensive. It's important to look at some of the socioeconomic factors and make sure, we as a society are making highly effective medications available to everyone so that we don't deepen those disparities.

RK: I fully agree. And, the individualization is so important, as you mentioned, because there are these differences by different demographic categories, not just race ethnicity, but by gender also by age. We know that as people age, their body composition changes, and their weight might not change that much. So the utility of BMI becomes even more something that has been debated. And I know something that we look at in our research as well. I think that knowing that there are potential differences; the World Health Organization, I know has proposed different waist circumference criteria as well for central obesity and different cutoffs for BMI in Asians, but just knowing generally that, it's not a one size fits all is very, very important. Well, thank you so much, Dr. Laudenslager, for being here today, for sharing your expert perspectives on weight management and obesity, specifically in diabetes. Thank you again for being here today.

ML: It's been such a pleasure. Thank you for having me.

RK: I'm Dr. Rita Kalyani, and you've been listening to Diabetes Deconstructed. We developed this podcast as a companion to our Patient Guide to Diabetes website. Our vision is to provide a trusted and reliable resource based on the latest evidence that people affected by diabetes can use to live healthier lives.
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