Article ID: GM89245

Monitoring Glucose Fluctuations in Patients With Type 2 Diabetes:
The Importance of Maintaining Glucose Control

Moderated by: **Pamela R. Kushner, MD[1,2]**

Discussants: **Eugene E. Wright, Jr, MD[3]; Isaiah Pittman, IV, MD, PhD[4]**

ABSTRACT

The discussion focused primarily on: 1) The clinical risks associated with fluctuating blood glucose levels in patients with type 2 diabetes, including hypoglycemia and hyperglycemia; 2) The clinical benefits of maintaining appropriate levels of fasting and postprandial glucose; 3) How to optimally monitor glucose levels in patients with type 2 diabetes; 4) How to interpret and apply available data on continuous glucose monitoring (CGM) with insulin and new antidiabetes therapies, including therapies that treat postprandial glucose; and 5) Potential considerations for the use and management of CGM in patients with type 2 diabetes. [Published online ahead of print March 11, 2019.] *Med Roundtable Gen Med Ed.* 2019 March 11.

Discussion held on November 20, 2018.

DR. KUSHNER: It is now recognized that patients with similar hemoglobin A1c (HbA1c) levels can have different glucose variability patterns and rates of hypoglycemia. Patients can use continuous glucose monitoring (CGM) as a tool to spend more time in the target glucose range. With the goal in mind to familiarize clinicians with the utility of such devices, a panel was convened to discuss this technology.

We'll start off by asking Gene, have you suggested CGM to a patient who is on oral anti-glycemic agents?

DR. WRIGHT: The use of CGM in patients who are on oral agents, I think, really depends on what type of oral agent they're on. Sulfonylureas, particularly in older patients, are agents for which I think CGM can be very revealing. Yes, I have used it with oral agents. Sulfonylureas can induce hypoglycemia that is often not recognized by the patient and clinician.

DR. KUSHNER: How about you, Isaiah?

DR. PITTMAN: I do quite a few insulin pumps and quite a bit of CGM, both professional and personal.

With that being said, I look at CGM oftentimes as a modernized way of patients being able to check their glucose or a way that—we can see clearly from the FreeStyle Libre (Abbott Laboratories)—will eventually replace the basic finger stick self-monitor glucose check. I find it is useful pretty much across the board from the standpoint, as Gene has already mentioned, to evaluate hypoglycemia that may go undetected from agents that are hypoglycemia-inducing and in patients with impaired hypoglycemia awareness.

At the same time, a picture is a thousand words. It's much easier to explain the idea of glucose control to patients by using an image from CGM versus having them look at their glucose, which a compliant patient may do four times a day.

Oftentimes, not just the patient but many clinicians will have difficulty with four-times-a-day glucoses after one month of readings. Then what do you do with those data, whereas they can see that continuous tracing

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This roundtable was supported by AstraZeneca. The discussants (authors) developed the discussion and reviewed the transcript for important intellectual content, and approved the final version for publication. The authors maintained control of the discussion and the resulting content of this article.

Published online at www.TheMedicalRoundtable.com • Search by Article ID

from a CGM and it's incredibly useful. This helps the patient to understand "I'm high here. I'm low there." There's a pattern to it. It's continuous day after day.

DR. KUSHNER: Excellent. I agree with you both that continuous glucose monitoring is a very useful tool and a more modern way of evaluating glucose control. We have been very glucose-centric as a society, just looking at what is this glucose measurement right now as opposed to what the variability and pattern are in each individual patient.

I feel that Gene highlighted the most important type of oral medication, which is sulfonylureas for the purpose of avoiding hypoglycemia. We'll talk more about hypoglycemia as we go along, but as was mentioned, this technology helps patients who may have a hypoglycemia unawareness with oral medications in addition to those who are insulin-dependent.

I would ideally use CGM in any patient who is not where we *both decide* that we want them to be. I think that it enhances shared decision-making and defines the goal of time in range in addition to HbA1c.

CGM helps to give people "teachable moments" and helps them become more motivated and involved in their own self-care by seeing what effect their diet has on them, specifically the role of carbohydrates and fats. It also gives patients a deeper understanding of the value and risks of exercise.

Considering that diabetes is not a disease that is solely managed based on medication but involves patient self-care, what better way to get them involved in their self-care than for them to recognize their trends and what they're doing day by day. This technology helps to facilitate a conversation with the patient to say, "Maybe there are different changes in either your medication therapy or self-care that we could help you implement."

DR. WRIGHT: Great. Well, Pam and Isaiah, I think what I've heard you say is that you also use this for behavior modification for the patient. Once they see their glucose or glycemic patterns throughout the day, they are now able to put some context to that individual number.

> ***"This technology helps to facilitate a conversation with the patient to say, 'Maybe there are different changes in either your medication therapy or self-care that we could help you implement.'"***
>
> **Pamela R. Kushner, MD**

I have also found when I have patients check their self-monitoring of blood glucose (SMBG), they get a number. That number rarely has context for them unless it's too high or too low.

Anything in between is kind of fuzzy, but I find that with an ambulatory glucose profile, the context that comes with that now gives them better definition about "Oh, it is high and it's going higher" or "It's low, and it's trending lower."

DR. PITTMAN: Exactly. I just finished clinic before we started this discussion and was explaining to a patient, as I oftentimes do, that the true management of diabetes is not treating hyperglycemia, it's preventing hyperglycemia.

DR. WRIGHT: I agree.

DR. PITTMAN: The way to show patients that they are basically treating high blood sugar is to show them that the blood sugar is already elevated. When they can see what a non-diabetic sees, which is glucose that barely elevates with a meal, then they get a true idea.

When you look at a CGM, they get the idea that the blood sugar is going up as I eat a certain meal or the blood sugar is going down when I'm not eating. That's clearly depicted when looking at a CGM, and it gives them an idea of "Am I in a physiologically normal pattern?"

Not necessarily a number—as both of you have stated—but does this pattern look normal? The blood sugar is basically staying within a consistent range, whatever that range; whether they understand that full range or not, is it staying relatively consistent?

DR. WRIGHT: That gets to another question. How does CGM better help us as clinicians manage diabetes? From my perspective, it helps to engage the patients more with their management.

DR. PITTMAN: Absolutely.

DR. WRIGHT: I have a very different conversation with the patient who's on the CGM than I do with a patient who is not, because I'm doing more listening and letting them tell me what's going on.

DR. KUSHNER: Right.

DR. WRIGHT: I coach them along with "What other choices might you make in these situations?" It is a very, very different conversation that we have as a result of the CGM report.

DR. KUSHNER: I think that's an excellent point. I no longer have patients on oral medications give me a fasting glucose value every day. In my opinion, there is very little value that the patient or I am going to get from that measurement.

What I have started to do with my SMBG is to have patients give me 7 measurements 4 days a month. That way the patient has the advantage of seeing how their glucose is doing on those days that they did the 7 measurements. It is a burden but is more useful. However, with CGM there is less of a need to do that anymore. I'm getting much more from a CGM than 7 measurements in a day, and the patient diary helps bring even more value.

The conversation is different. The motivation is different. The patient's understanding and involvement are different, but also what you said, Gene, is important: The physician or the health care provider's involvement is different. I think this is an advantage that is often not recognized.

DR. WRIGHT: Well, I think in terms of time management, it actually helps you speed your office visit along on the diabetes portion of it.

DR. PITTMAN: Absolutely, it does. That goes back to a statement that I made earlier when a picture really is a thousand words. When patients see their CGM, they understand exactly what you're referring to in terms of the term glucose fluctuation or blood sugar fluctuation.

They understand what you mean because they can see it going up and down at a given time of day. It absolutely makes things faster for communicating with the patient and, looking at those data before you even walk in the room, being able to interpret what you'd like to do and what conversations you want to have.

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>
> **Isaiah Pittman, IV, MD, PhD**

DR. KUSHNER: Let's move on to what HbA1c level the patient needs to be at before you would consider using a CGM. What are your thoughts?

DR. PITTMAN: We do a professional CGM. Again, there's a difference between personal and professional and different rationales behind them. We would use a professional CGM with pretty much all of our patients.

The HbA1c doesn't determine it. The reason is that if they're diabetic, whether they're a type 1 or type 2 diabetic, glucose variability is what we want to prevent. Going back to what was stated earlier, from the standpoint of normal physiology, there's only a small degree of variability.

As a result, to try and normalize things with the CGM, whether the HbA1c is 6.6% and the patient doesn't realize that they're having a hypoglycemic episode or hyperglycemic episode until you use a CGM or the HbA1c is 9%. The reality of the matter is that patients can see where you're trying to get to. They can see that variability with the CGM, when it's used professionally.

Then when they have it on their own for a personal CGM, whether it's an insulin pump patient, multi-dose injection patient, or a patient who's on oral meds, they can see that glucose variability. That's incredibly useful to them on a day-to-day basis. I don't think HbA1c plays a huge role.

DR. WRIGHT: I couldn't agree more with you. I agree that the HbA1c doesn't determine who gets the CGM. There are patients, certainly with low HbA1c levels, where you suspect hypoglycemia, but it is more concerning in patients who have high HbA1c levels where you don't suspect hypoglycemia. I'm aware that there are studies that show that even at an HbA1c of 8%, 8.5%, and 9%, patients can have frequent and severe hypoglycemia at an HbA1c level where most people would say, "Oh, just push ahead with more therapy."[1]

I think when you peel the onion back on the HbA1c, it really is just an average. That average is influenced by a lot of things, and the variability—you're absolutely right, Isaiah—is from the bottom to the top. All of those numbers in between are where you really can see on the CGM what the HbA1c doesn't give you.

DR. KUSHNER: Where would you find the measurement and describe what the measurement is for variability? If you have a CGM in front of you, what are you looking at and in what order?

DR. WRIGHT: Well, I look for the risk of hypoglycemia first. Are there times of day when the blood sugars are running low? Then I look at the variability at different times of day, typically around the meal, so that if there are some meals associated with blood sugars of 100 and some associated with blood sugars of 300 at the same meal, that might suggest a behavioral component. We as humans tend to eat different things on different days at the same meal. That may contribute to the variability.

Then the third thing that I look at is where the high blood sugars are occurring. What are the kinds of things we can both do with medication and behavior? After addressing the low risk and the variability, what are the things we can do with medications and behavior to then bring that into more of a reasonable range?

DR. KUSHNER: What do you think about that, Isaiah? What are your thoughts?

DR. PITTMAN: I would agree. I first look for hypoglycemia, which is why on pretty much every CGM—I don't care whether we're talking about Medtronic CGM systems (Medtronic), Dexcom CGM (Dexcom), or FreeStyle Libre (Abbott Laboratories)—it's below the red for a reason. They're trying to grab our attention. Whether you're looking at a pie chart or a bar graph, their mark is red when they're low.

Whether they're low or high, the discussion that I'm having with the patient is normality. We're trying to get you to normal glucose levels. As Gene alluded to the HbA1c not being reliable, I was taught very early on a little story that I'll share.

The HbA1c, I was taught, is like the average temperature. One of my attendings when I was a resident would say that if you're not from the United States and you pick a place to live, then you would say, "Well, Oklahoma City is as reasonable a place to live as San Diego because in the almanac the average temperature is close to the same." You have no idea that Oklahoma City is incredibly cold in the winter and incredibly hot in the summer.

> ***"...CGM, both personal and professional, has changed my patients' lives and certainly changed mine. It changes the conversation that we have in the room. It helps them get re-engaged in their diabetes management. Many of them now do not feel that their diabetes is controlling their lives. They have a greater sense of control over their diabetes."***
>
> **Eugene E. Wright, Jr, MD**

DR. KUSHNER: That's great. I love that analysis.

DR. PITTMAN: San Diego is always a steady 76 to 82 degrees. That's your HbA1c. Your HbA1c will give you that average, which again, without the knowledge, you have no idea what you're looking at, whereas we're trying to normalize the glucose levels. To do that, as straightforward as it may seem, we need to see the glucose levels. That's where CGM comes in.

DR. KUSHNER: Now, obviously, you would like your patients to have as much time in range as possible. Is there a number that either of you is looking at for the ideal time in range?

DR. PITTMAN: I'm generic with it. Everybody's a little bit different, everybody doesn't achieve this, but just giving them something to shoot for I will tell my patients 80 to 120 mg/dL plus or minus 10 mg/dL. That's just something I tell patients all the time, "We want you at 80 to 120 mg/dL plus or minus 10 mg/dL, meaning you can go up to 130 mg/dL, and I'm okay. You can go down into the 70s, and I'm okay."

Significantly outside of that range, whether it's on the hypoglycemic or hyperglycemic range, the CGM allows us to act and make changes.

DR. KUSHNER: You are looking at time in range?

DR. PITTMAN: I am looking at time in range. I'm saying all the time, 80 to 120 mg/dL plus or minus 10 mg/dL. In other words, if you were not diabetic, what would happen to your blood sugars? With today's agents, we can achieve that very significantly.[2]

It's more difficult with insulin and an insulin pump, but consider that today, even following the guidelines, there are metformin, glucagon-like peptide-1 receptor agonists (GLP-1RAs), sodium-glucose cotransporter-2 (SGLT2) inhibitors, dipeptidyl peptidase 4 (DPP-4) inhibitors, thiazolidinediones (TZDs), and alpha-glucosidase inhibitors. Those are all non-hypoglycemia-inducing agents. That's 6 options before you even get to insulin.

Really, hypoglycemia is an issue for the insulin-using patients, many of

whom may be on inappropriately high doses of long-acting insulin because they're not on a GLP-1RA. They're not on an SGLT2 inhibitor, or they're on a sulfonylurea. I really do try to get as many people as I can into a normal range, a normal physiological range for glucose, because you can avoid hypoglycemia most of the time based upon the appropriate American Association of Clinical Endocrinologists guideline agents used.

DR. KUSHNER: I like that. What do you think, Gene?

DR. WRIGHT: I think time in range has been a very valuable tool to help patients understand how they arrived at that HbA1c. Many of the patients I see in the rural South here have heard about HbA1c. They have varying degrees of understanding about what HbA1c is, but the general sense is that lower is better. I like to get them to think about it in the context of how it depends on how you get there.

DR. KUSHNER: Please elaborate on the difference between the average and how you get there.

DR. WRIGHT: We talk about the average being an average of 154 mg/dL glucose, which is an HbA1c of approximately 7%. If all of your blood sugars were between 120 and 188 mg/dL, that would be 154 mg/dL on average. You could also have an average of 154 mg/dL if you were between 50 and 258 mg/dL. They look at that and they say, "That's not good." I say, "Precisely." What you want to do is you want to look at how much time you're spending in that range between those magic numbers (120 and 188 mg/dL).

Now, for my older patients, I like to keep them between 100 and 200 mg/dL. I don't like the older patients, particularly if they're on insulin, to go much below 100 mg/dL. If they do, we don't get too excited, but if they get down and they're spending time below 70 mg/dL, I become concerned. I tell them, "Don't worry if you're 180 or 200 mg/dL after a meal. It's okay. Take note of it. Adjust it if you like." The CGM has allowed them to see these and not be afraid or think they know what's going on with one number.

DR. KUSHNER: Thank you both. You also mentioned the difference between professional and personal CGM. Can you give me an idea of how you're using these technologies differently? I think that we could use a little elaboration on that.

DR. PITTMAN: For professional CGM, the patient is blinded and so is not able to see the monitoring, obviously, especially for the patient who is on insulin. The reason I say it is for the patient who's on insulin is that they're typically more knowledgeable about their diabetes. They've been diabetic for longer periods of time. Not to say that it's intentional, but they will obviously modify their behavior when you can see everything that's going on with their glucose.

Now, this is a plus on a day-to-day basis, but from the standpoint of assisting with dosing, sometimes it can be a hindrance because when you're deciding the changes that will be made in their therapy, if they're making changes specifically because they can see what's happening, then that's not always as helpful, which is why professional is blinded. While wearing a professional CGM device, the patient is encouraged to continue their routine self-monitoring of blood glucose so they are able to see the gaps when we review the professional tracings.

Even for my patients who have a personal CGM, I will sometimes do a blinded study just to get a true idea of whether they're using an insulin pump, what the pump settings should be or whether it's their current therapy, what they should be doing even when they own a personal CGM, because they're knowledgeable.

We're not always 100% honest with what we're doing when someone is watching. The professional CGM gets rid of that factor. It's no different than a blinded clinical study.

DR. KUSHNER: That's a very good point.

DR. WRIGHT: I agree. Certainly, in the patients who I see, at the time that they are getting ready to change therapy, talking about adding a therapy or modifying a therapy, a blinded CGM is quite revealing. It's revealing to me, but it's also revealing to the patient.

That helps us direct what therapy we want to use that may push us more toward a GLP-1RA, or it may push us toward one of the other categories of medicine—focusing on, is the problem more postprandial or is it more fasting?

DR. KUSHNER: I like the fact, Gene, that you're breaking it up into postprandial and fasting so that they both equal one, but you're looking at them separately to help you guide therapy and identify patterns.

ANTI-GLYCEMIC AGENTS DISCUSSED

sulfonylureas, metformin, glucagon-like peptide-1 receptor agonists (GLP-1RAs), sodium-glucose cotransporter-2 (SGLT2) inhibitors, dipeptidyl peptidase 4 (DPP-4) inhibitors, thiazolidinediones (TZDs), alpha-glucosidase inhibitors, insulin

DR. WRIGHT: Yes, I try to use that as a way at least for me to think about and to begin the discussion with the patient about targeting our therapies. Certainly, in the postprandial range we have medications, but there's a significant behavioral component to the postprandial as well.

We'll have the conversation that "Medicine will help, but you've got to help the medicine." With respect to fasting elevations, many times, fasting elevations follow high postprandials. That's a problem with a decrease in insulin production or sensitivity overnight. We have a different way to approach that.

DR. KUSHNER: What's your different way to approach that?

DR. WRIGHT: Well, depending on how high it is, insulin is one way. I often talk to them about how metformin works and how it works to decrease glucose production. I often talk a little bit about TZDs and how they increase your sensitivity to the insulin your body makes. There are different conversations that we can have with different patients depending on where they are in that spectrum of hyperglycemia.

DR. KUSHNER: When I think about the professional use, I also think it's safer because of something that you both mentioned. Sometimes the patient may be adjusting medication doses quickly by themselves when they see variability in a personal device without looking at the whole picture. Without guidance, this behavior could put them in a more dangerous situation.

DR. PITTMAN: From the standpoint of fasting and postprandial, CGM data would have probably changed the guidelines for the American Diabetes Association (ADA) as well as possibly the American Association of Clinical Endocrinologists if CGM was performed when glargine was actually being used. Glargine probably would not have become the number-one used insulin, because the reality of the matter is that most of the people who were using glargine were treating postprandial hyperglycemia unknowingly, with significant reduction in glucose overnight because most of the fasting hyperglycemia that was being treated was secondary to postprandial at bedtime hyperglycemia.

DR. WRIGHT: Isaiah, are you having them check bedtime blood sugars?

DR. PITTMAN: Well, that's what I mean. Most people were not checking bedtime glucose. In fact, very few were.

DR. WRIGHT: Absolutely.

DR. PITTMAN: When you use the CGM, it's very easy to show a patient that your fasting hyperglycemia is actually not fasting hyperglycemia. It is persistent bedtime hyperglycemia, meaning you were high when you went to bed last night. You just never checked your bedtime glucose.

You take your bedtime insulin, because you don't check at bedtime, thinking that the reason you take this insulin is to stop your blood sugar from going up overnight. In reality, we know that the overwhelming majority of people are taking large doses of long-acting insulin at bedtime, and it's actually dropping the glucose overnight, meaning it's going from 300 to 100.[3]

They just don't know that because they're not checking at bedtime. They're only checking in the morning. They have no idea that when they take this 70 units or 60 units of long-acting insulin, that in fact the blood sugar is dropping.

Since it doesn't cause them to drop low because they're starting off at 300 at bedtime to begin with, they don't feel anything, so they think, "Hey, my blood sugars are great. I'm waking up with blood sugars of 110 mg/dL, 120 mg/dL, so I'm doing great," when in reality, the HbA1c is high because as they eat, it goes up and up and up, like staircasing throughout the day. That's what happens, and CGM can show the patient that very, very clearly. It wakes them up and they say, "Whoa, wait a second. I'm high at bedtime."

DR. WRIGHT: Also, it shows the issue of treating with too much basal, trying to chase daytime hyperglycemia with basal insulin.

DR. PITTMAN: When we look at basal insulin on the current guidelines, notice it's not in the first, second, third, fourth, or fifth slot for a reason, because, realistically, most people don't need large amounts of basal insulin unless they're truly insulin patients.[4] The reality of the matter is our patients are eating. They have to eat to survive.

The oral glucose tolerance test is still the gold standard for a reason.[5] That's going to be the first elevation, and that's where we're going to see the most elevation, but our patients don't understand that, the whole concept of overbasalization.

When I'm doing lectures, I always remind people, "Look, the term overbasalization, we've got great insulin today, but we have to remember this term didn't exist within neutral protamine Hagedorn (NPH) because no one just gave 80 units of NPH at bedtime." NPH insulin was usually spread throughout the day instead of large doses being taken at one time. That just didn't exist.

DR. WRIGHT: A point that I make

to the patients oftentimes is you spend the majority of the day in the fed state, only a small portion in the fasting state.

DR. PITTMAN: Yes, absolutely. Over two-thirds of your time is in a fed state. You need full-time control. That's demonstrated with the CGM.

DR. KUSHNER: I think that's great. The other thing that you mentioned, which our next question will address, is the hypoglycemia. Your patient may be symptomatic if they have hypoglycemia and wake up. Your patient's not going to wake up if they're hyperglycemic. They're going to sleep more if they're hyperglycemic at night. They think, "Oh, I'm not having hypoglycemia." No, you're not. You're having hyperglycemia at night.

DR. PITTMAN: Exactly.

DR. KUSHNER: I want to discuss some of the disadvantages of having your patient hypoglycemic. We all want to avoid the risk of death and cognitive changes that can happen, but there are also mood problems and fear.

It's important to emphasize that there is a fear about exercising and a fear about not eating; this makes people eat even more. These are some of the reasons we want to pick up the hypoglycemia.

What is the role of the newer postprandial anti-glycemic agents in the management of blood glucose and the use of CGM?

DR. WRIGHT: I think Isaiah just mentioned that we spend approximately 60% of our time in the fed state. The postprandial state, that is where the first defects are that we see in people along the continuum or the natural history of diabetes. Having agents now that target that period in terms of glycemic lowering has been a great advantage to our treatment.[6] We should no longer just treat the fasting alone and hope that the postprandials will take care of themselves.

DR. KUSHNER: Right.

DR. PITTMAN: I will simply ditto that. The reality of the matter is that as much as we may want to ignore the historical fact of how guidelines were created, we have to consider that those guidelines were created based upon what we had available to us and what the majority of clinicians were comfortable with.

We really did not have therapies that were very directed at postprandial glucose control. Therefore, our guidelines focus largely on fasting glucose, whereas now we have significant ability to treat mealtime glucose or, in other words, prevent that hyperglycemia from occurring, truly normalizing glucose.

Reiterating the statement that I made earlier, the true management of diabetes is not treating hyperglycemia. It is preventing hyperglycemia. That's when you are truly in a physiologically normal range. We have therapies that can assist with that now. It's physiology. That's where we want to be.

CGM allows us not only to see that as clinicians but to demonstrate it to patients. "Look, your blood sugars used to go up when you ate a meal. Now you're on a GLP-1RA. Now you're on an SGLT2 inhibitor. Now you're on a DPP-4 inhibitor. Now you're on a TZD. Now you're on mealtime insulin or an insulin pump, and you don't see that anymore. You can eat and the blood sugars don't go up. Look at this graph compared to where it used to be." They can see it. It's very clear, and it's useful.

Clinical Implications

- **Self-monitoring of blood glucose (SMBG) only gives a measurement of blood glucose at a specific point in time. Therefore, SMBG often misses trends in glucose fluctuation, including hyperglycemic/hypoglycemic excursions.**
- **HbA1c measurements are more limited because they give an average reading over 90 days and cannot alert a patient of daily glucose fluctuations.**
- **Many patients can have daily fluctuations in blood glucose levels even if their HbA1c levels are within target ranges.**
- **Continuous glucose monitoring (CGM) devices overcome the limitations of SMBG and HbA1c, allowing better blood glucose management.**
- **CGM devices also enable the clinician to better manage new antidiabetes therapies, including therapies that treat postprandial glucose**

DR. KUSHNER: It's important to recognize that postprandial glucose is one of the earliest changes that we see in adult-onset diabetes mellitus. We now have good ways to treat postprandial glucose. In addition, I would echo your comments, Isaiah, that the true management of diabetes is not just preventing hyperglycemia but also preventing hypoglycemia.

By using glucose-dependent medications, we can help patients stay more in a target range. Some GLP-1RAs can document a steady state. Imagine a steady state in diabetes. I like the idea that CGM, something Gene had mentioned earlier, not only helps direct our patients' behavior, but it also helps direct our behavior.

The only caution I would give clinicians is that when you're looking at a CGM, remember Rome was not built in a day. Safety first.

DR. PITTMAN: Exactly.

DR. KUSHNER: Once we document a pattern, we can address the sulfonylurea, insulin, or whatever that hypoglycemic risk is. Next, we can bring down the glucose safely and more effectively in the more frequent fed state.

DR. WRIGHT: Well, your point is well taken. One of the points I think you and Isaiah made earlier, we now have targeted therapies that will decrease that variability. During the day, the GLP-1RAs, for instance, the once-a-day and the once-weekly GLP-1RAs, have a very favorable postprandial and fasting profile. You're kind of getting two for one with that.

The guidelines are starting to reflect that you may want to look at a GLP-1RA earlier in the course of the disease progression, recognizing that fact that if we can increase your time in range without putting you at significant risk for hypoglycemia, that's a good thing.

DR. PITTMAN: Not coming down on the ADA at all, but I'm going to say it as an endocrinologist. The ADA guidelines are really not useful for the average clinician when it comes to truly managing the diabetes and a discussion about CGM.

The reality of the matter is that we really don't want to jump straight to basal insulin or potentially a sulfonylurea unless there is a cost issue or something like that with the patient such that you must do this. If you're looking at true management, the fact that we have 6 options before we don't even have to consider a risk of significant hypoglycemia, that's huge. That's huge in the 21st-century management of diabetes, 6 potential options that don't cause hypoglycemia, which is found in the guidelines.[4] It should be noted however, that in the *2019 Standards of Medical Care in Diabetes*, a GLP-1RA in patients with type 2 diabetes not in control after 2 or 3 oral agents, may be recommended as the first injectable therapy.[7]

DR. KUSHNER: I have a question for both of you. You have a clinician who's seeing a patient who's had hypoglycemia on a sulfonylurea, and they notice this on the CGM. Now they're saying, "Oh, I want to do safety first. I want to limit the hypoglycemia, so do I stop the sulfonylurea?" Do they just accept the fact that that patient is going to be high for those next few weeks until they do another CGM?

DR. PITTMAN: I would say replace the sulfonylurea; don't just stop the sulfonylurea. That's what I do with patients all the time when they're in clinic, when they come in on a sulfonylurea. If they're on a sulfonylurea and they're relatively controlled, it can be stopped and replaced, but if they're uncontrolled, you leave it, because it's helping you maintain control until you gain control.

For the patients who are relatively controlled—and especially when they're elderly, as I think both Pam and Gene alluded to earlier—for the elderly patients, you want to be careful. I try to get rid of that sulfonylurea to make both of our lives easy, and we don't have to worry about it, so I'm going to replace it.

DR. KUSHNER: Gene?

DR. WRIGHT: I agree with that. I oftentimes replace sulfonylureas in the patient for a couple of reasons. Many of our patients have decreased renal function. I do not like sulfonylureas in people that have glomerular filtration rates less than 45 mL/min. I'm not a big fan of sulfonylureas in the elderly.

Furthermore, I have seen as much hypoglycemia in younger patients on sulfonylureas because their lifestyle varies from day to day. They may miss a meal. They may do this. I just found more trouble with the sulfonylureas, and I quickly go to some of the other agents that we have available.

DR. KUSHNER: It's also a time where a patient can use a personal device for monitoring. This helps the patient be sure they're not getting very hyper if you're changing therapy, like a GLP-1RA, which will take some time to get to a steady state than on a lower dose on a sulfonylurea.

Any final comments anybody wants to make?

DR. WRIGHT: I'll just say that CGM, both personal and professional, has changed my patients' lives and certainly changed mine. It changes

the conversation that we have in the room. It helps them get re-engaged in their diabetes management. Many of them now do not feel that their diabetes is controlling their lives. They have a greater sense of control over their diabetes.

DR. KUSHNER: I agree. Isaiah, any last pearls you want to share?

DR. PITTMAN: I would ditto exactly what Gene said. At the same time, considering the fact that as we move forward with CGM, considering the financial aspects of glucose management, there was a recent presentation at the 2018 ADA Scientific Sessions that a (>10-day) CGM recording was as good as the HbA1c.[8]

I think we're rapidly approaching a time where we will find that CGM is not only more useful than actually doing the finger sticks multiple times a day, but it's actually going to end up being more cost-effective than glucose strips four or five times a day for a given patient, especially once they're under control or close to being controlled.

DR. KUSHNER: Thank you. The future is now, and CGM can help clinicians become more effective communicators and open up the communication about self-care.

Thank you both for sharing your time and expertise!

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