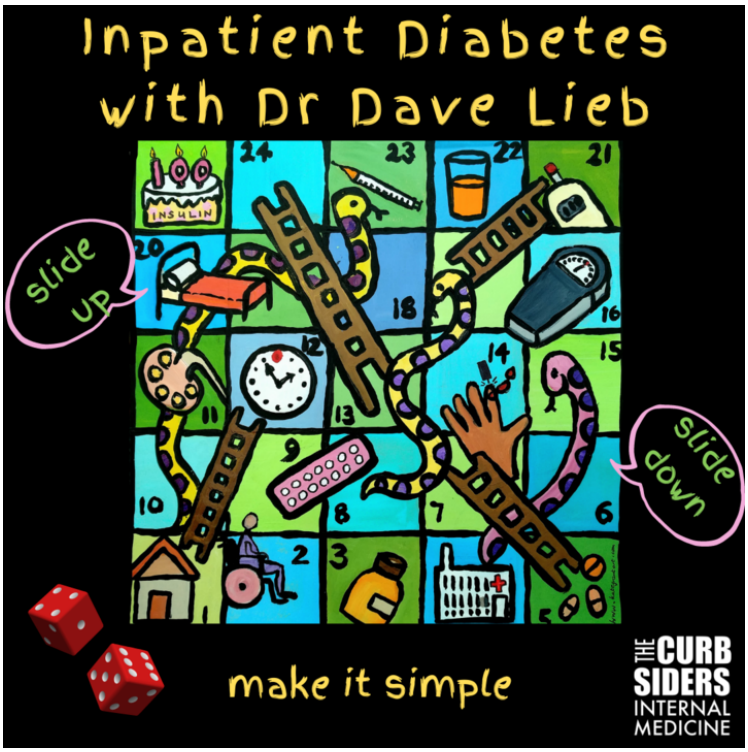
#330 Inpatient Diabetes with Dr. Dave Lieb

Part 1



[Disclaimer]

Matt: Paul, yet another evening spent podcasting.

Paul: [laughs] I wouldn't have it any other way, Matt.

Matt: [chuckles] Well, hopefully you had a good day at work. I think we're going to have a great night tonight, and we have a great show for the audience. How was your day, Paul?

Paul: [laughs] I do not like this new format. It was fine. Thanks for asking. How was yours, Matt?

Matt: I know you don't like small talk, Paul. I know you keep it really close to the chest. So, I'm trying to get the audience a little peek into how your day goes.

Paul: [laughs]

Matt: He's still wearing a shirt and tie. It's like 10 o'clock at night audience.

Paul: This is what I sleep in, yeah.

[laughter]

Matt: On tonight's show, this is part one of a two-part episode on Inpatient Diabetes Management, with a fantastic guest, Dr. Dave Lieb. And, Paul, before we introduce our guest host for this one, can you remind people what is it that we do on the Curbsiders?

Paul: Sure, happy to as always Matt. A reminder that we are The Internal Medicine Podcast. We use expert interviews to renew clinical pearls and practice changing knowledge. I should also mention we are joined by Hospitalist Wizkid Adam Barelski. Adam, Can I call you a Hospitalist Wizkid Adam Barelski?

Adam: If you must, Paul. [chuckles]

Paul: Yeah, I do. Hospitalist Wizkid Adam Barelski, coproducer, cohost for this particular episode.

Matt: Paul was absent, by the way, audience.

Paul: Yeah. Did all the heavy lifting because I wasn't there to carry Matt like I usually do. Adam, tell us about a little bit about what you guys talked about tonight, and I'll let Matt tell you who we talked in a little bit more detail.

Adam: Yeah, we had an amazing conversation with Dr. Dave Lieb, as Matt said. I was very happy to join. So, Dr. Lieb walked us through broad spectrum of inpatient diabetes care, including how to select insulin regimens, what to do with oral hypoglycemic agents when patients are admitted, what to do when patients are started on steroids and much, much more.

Matt: Yeah. We should mention that you're coproducer for this one, cowriter was Dr. Cyrus Askin who was initially supposed to be partially a cohost, but parenting, unpredictable. And Cyrus, we missed you on this one. Let me tell the audience about the guest which was Dr. Dave Lieb, MD, FACE, FACP. He's an Associate Professor of Internal Medicine and Program Director of the Endocrinology Fellowship Program at Eastern Virginia Medical School in Norfolk, Virginia. His clinical interests include thyroid disease including nodules and thyroid cancer management, as well as type 1 and type 2 diabetes management and transgender endocrine care. When he's not in clinic or teaching, Dr. Lieb enjoys promoting the *#endotwitter* on Twitter, and of course, spending time with his family.

Paul: In addition to your basal knowledge, Dr. Lieb will give you a bolus of sweet, sweet diabetes knowledge food.

[music ends]

Matt: Dave, the first question I'm going to ask you, can you tell the audience, give them a one liner about yourself, maybe tell them an interest or hobby you have outside of medicine?

Dave: I am an endocrinologist, a clinical educator and a comic book enthusiast. I'm also a proud husband and father of three amazing boys, who I think maybe set a record for pieces of broken furniture during the COVID lockdown.

[chuckles]

Dave: I also have cats, and I have type 1 diabetes. I feel like I need to come clean and mention the diabetes [crosstalk] at the beginning.

Adam: It's a disclosure.

Dave: That's a big disclosure. I'm pretty biased.

Matt: So, you're like ultra-qualified to be talking to us.

[chuckles]

Dave: I hope so. [laughs]

Matt: Well, Paul usually asks about books. I like to read graphic novels. Is graphic novels and comics same kind of thing, right? Eventually comic issues get combined into graphic novels.

Dave: Yeah.

Matt: I know sometimes, they write them out. If someone was just to say, "I've never read a graphic novel or a comic, what should I start with?" What would you recommend?

Dave: Oh, that's a good question.

Matt: Or, maybe like two or three, you don't have to pick one.

Dave: Everybody says *Watchmen*. I'm not going to say *Watchmen*. That can be a tough read, and it's not everybody's jam. *All-Star Superman* by Grant Morrison is a great book, a feel-good comic about sort of the first superhero. I would go with that one. If you're looking at the hero stuff.

Matt: Yeah. The first line of *Watchmen* is pretty spectacular though. It's very grim, but pretty spectacular.

Adam: What is it?

Matt: You can look that up. Something about like burst dog's stomach or something. He's just talking most grim line about the city ever. It's this dude standing on top of a building. It's great.

Adam: That sounds familiar.

Matt: I wish I had it memorized. It'd be a lot cooler if I did, but I don't.

[chuckles]

Matt: We have a big topic, but probably, time for you to ask at least one question of, Dave, before we get on to the diabetes here.

Adam: Yeah, I'm curious, Dave, if you could tell us a little bit about some feedback that you've got that's been meaningful in terms of your professional development?

Dave: Oh, yeah. That's a great question. I am not the most efficient person in the world. Anybody that I've ever worked with, or worked for will tell you that. I've gotten better, I think over time. But probably some of the best advice I've gotten with respect to efficiency came from Jim Reuler. Jim is an internist in Portland. I did my residency in Portland, Oregon. He was one of my teachers and mentors at the VA clinic. He said, "Make sure that the work you're doing is doctor work." I understand now what he meant by that. There's work that only I could do, there's work that only nurses in our clinic could do, there's work that that only other staff members could do. And I think he was trying to teach me how to delegate, which is a critically important leadership skill. I'm still not great at it, but I'm working on it.

The other piece of advice I'll mention is from my grandma, [unintelligible [00:06:43], may she rest in peace. Grandma used to say, "Don't worry, until you really need to worry." That's advice that I've given to friends, colleagues, patients. It's good advice all the time.

Adam: It seems very applicable these days.

Dave: Yes, it is.

Matt: [laughs]

Dave: Yeah, for sure. [chuckles]

Matt: Are you implying that, like me, you worry constantly, Adam?

Adam: [laughs] Just the world we live in.

Matt: Yeah. Adam, did you want to recommend anything to the audience? So, it's been a while since you've cohosted, anything?

Adam: I have not prepared a pick of the week but I will say, as spring is starting to come that I've been watching more *Gardeners' World*, which is a show on the BBC, by Monty Don. It's one of the most British things that you'll ever experience. And he every week tells you about how to garden and what to do for the next week. And it's been going on for like 35 seasons, and he and his dogs just walk around

the gardens of Longmeadow. And it's really riveting. I've started my indoor gardening this week and that's been on my mind a lot.

Matt: That's a great recommendation, and probably good for anxiety as well. I probably should take that up.

Adam: It's a little like the *Great British Baking Show*, except with a gardening theme. So, if you're into that kind of thing, then I recommend checking it out.

Matt: I think Paul and I almost every time gardening comes up on this show, threaten to start gardens, and we have not done any of that yet, but maybe. I've got to check that out. Thank you for that recommendation.

Adam: Gardening is good to start as a spectator sport, and then work your way into it a little bit later.

I'll start with a case from Kashlak. David, we have Enzo who is a 62-year-old man with diabetes, type 2, and obesity, who is admitted on our service for pneumonia. At home, he takes metformin-sitagliptin combination pill, empagliflozin and he was recently started on dulaglutide. His last A1c was 8.4 a month ago, his labs are notable for a white count of 12,000 and a serum creatinine of 1.3. His serum glucose is 214 when he's admitted. He started on ceftriaxone and azithromycin for his pneumonia.

Just to start, I'm curious if you could talk to us about how you think about managing diabetes in the hospital, just in general from a 10,000-foot view?

Dave: The most important thing about managing diabetes in the hospital is to be proactive. The moment that you lay eyes on that person realize that they have diabetes, you need to think about what their discharge plan is going to look like. And if you're thinking about their discharge, that'll help you a great deal, I think, in the hospital during the hospitalization. What medications can they afford? Who do they live with? If you're sending them home on insulin, had they ever been on insulin before? What kind of education are they going to need during the hospitalization? Can they give themselves an injection, all of those sorts of things, I think, are pretty important. So, being proactive and planning ahead, thinking about what's going to happen after they leave, because to me, that's probably the most significant transition, is that leaving the hospital, getting back to their primary care team.

I also think that every chance you have in the hospital to educate the patient, and their family, or their caregivers is also key. Patients are often in the hospital for a long time. Sometimes they've come in for a surgery, and then they stay for care after the surgery. And you can use that time to talk to them about physical activity and their diet, and things like checking their blood sugar and continuous monitoring. So, using the opportunity for education, I think, is really key.

Matt: I think it could be confusing in the hospital for patients, because a lot of patients start getting insulin or Accu-Cheks. They maybe have never had that before, and they'll ask you, "Do I have diabetes? Why am I getting Accu-Cheks?" This is I'm just talking patients without even diabetes, and it's just an example that we don't tell patients enough about what we're doing to them or what to expect,

and just planning ahead, like, "Oh, yeah, if I order Accu-Cheks in this patient, someone's going to come into the room four times a day and check their sugar, and maybe even offer them insulin." You need to really counsel people, because people just are overwhelmed, I think, by it.

Dave: Absolutely. It's overwhelming, and it's scary. Diabetes is scary. Everybody knows somebody who was on dialysis because they had diabetes, or had blindness or something else terrifying related to diabetes. When people get their blood sugar checked or get an injection of insulin, what they think is going on maybe totally different from what you think is going on, so you have to explain things to them, I think.

Matt: We're going to get into what to do with the outpatient meds. But this is a person where they're on oral medications, mostly, maybe, well, they were recently started on a GLP-1, so they're not totally naive to needles, but commonly, you get patients who are only on orals then in the hospital you're getting insulin, and they're like, "Am I going to have to have this all the time now for the rest of my life?" Patients freak out about that sometimes, appropriately so.

Dave: Absolutely.

Adam: I think Dave, the recommendation matches up well with what we as hospitalists talk about all the time, which is always planning for discharge, that everything that we do, we have to think about what's going to happen when they leave the hospital and make sure that they have a good and safe discharge plan. I like too, what you said about that it's important to educate and be proactive about planning for this, and when they leave the hospital, the most important thing is, their outpatient plan. I'm curious, what in terms of the actual diabetes management in the hospital? What are we trying to accomplish with managing their diabetes? I don't mean in terms of actual target range, we'll get into that, but why do we care about blood sugar's when they're in the hospital?

Dave: You have to be really patient focused. So, if it's somebody that's come in for bypass surgery, and you're worried about a wound infection, well, it's reasonable to keep their blood sugars maybe more tightly controlled, because you can reduce the risk for wound infections in the future. If it's somebody that's at really high risk for hypoglycemia, and older patients, somebody that's got renal disease, or liver disease, somebody who's not going to be able to grab the call button or get help if they're in trouble. Those people, you probably don't want to keep too tightly controlled. A lot of it is really patient focused depending on what their whole picture looks like. You should talk to the patient and figure out what their goals are too when it's-- I mean, that's always appropriate. Sometimes it's easier to have those conversations in other times. But we certainly have people at Kashlak, who maybe are kind of end-of-life patients that don't really need to have very tight glucose control. And that's a perfect example of, what are we doing? What's the goal here?

Matt: I want to ask about this guy, with Enzo, we didn't make it easy on you. He's 62, he's on three oral meds, plus dulaglutide and you can also tell me how to pronounce that.

Adam: [laughs]

Matt: He's got pneumonia and he's getting antibiotics for that, and he's coming in with some elevated sugar. What would you do with his outpatient meds when he comes in? I think this can be confusing for people. How would you think about these specific ones?

Dave: A very confusing, confusing for the folks that are taking care of the patient and confusing for the patient. Like you were mentioning before, Matt, where people come in, and all of a sudden, they're getting insulin injections. And it's like, "What's going on? This isn't what I do." Generally speaking, I will stop most home medications, and there are a couple of reasons for that. One, there may be side effects of the medications that we want to anticipate and prevent. The second thing is we need medications that allow us flexibility, because in the hospital, the patient status may be changing from moment to moment, and insulin allows for that. Other medications are not quite as good. As an example, he's on empagliflozin, and empagliflozin, we may talk about this later, has been associated with euglycemic ketoacidosis.

What if he's NPO for a procedure? What if he has to get a bronch and he can't eat anything. He's at risk for becoming ketoacidotic if that medication is still on board. The sitagliptin and dulaglutide, which you got, you nailed that, are safer medications. Unless, there's some concern that the dulaglutide, which is new may cause some GI distress. Then the last thing you want to do is slow his gut down and have him not feel like he's eating it. Unlike the sulfonylurea, those medicines only really cause insulin release when there's food around. So, they're less likely to cause low sugars. So, they tend to be safer, but will often stop them, again, because of the flexibility that insulin provides us.

Metformin always gets a bad rep, because of the potential risk for lactic acidosis, and somebody who's got risk factors, like heart failure and kidney failure. Again, without a crystal ball, it's hard to say, if he can have a side effect related to one of his antibiotics and develop renal failure, and then you're kicking yourself, because you didn't stop the Metformin. Oftentimes, we will use insulin and stop almost all the outpatient medications, but the key thing is making sure that when they go home, those medicines are either restarted if it's safe, or there's some sort of communication to whoever's going to take over their care, that says, "We stopped the Metformin because we were worried he might develop renal failure, but he didn't. So, it's okay to start it again." Because otherwise they end up seeing their doctors, and they're like, "Well, I don't know why you're not on this anymore, but it looks like you're on insulin." I think it's helpful to clear that up before people leave.

Matt: I wanted to clarify with the sulfonylureas, I thought they caused release of insulin, regardless of what the sugar was doing. Is that--?

Dave: Yes. No, that's right. I may have said it backwards. If somebody takes a sulfonylurea, it doesn't matter if they're eating or not, it's going to cause their beta cells to make insulin. The risk for hypoglycemia is super high, especially in the patient who may not be eating in the hospital, whereas with the DPP-4 inhibitors and the GLP-1 receptor agonists, those are really glucose dependent. If somebody's not eating, there's a much lower risk for hypoglycemia.

Matt: Okay. I might have misheard the first time. I think that's a good point. That's why we like those newer agents. Less risk for hypoglycemia and probably because we're not going to talk about a

perioperative case tonight, but empagliflozin, gliflozins, the SGLT2 inhibitors. I know preoperatively, it's something like three to four days. There's one of them, they want you to hold for four days, preoperatively. As of right now, I don't see those being used in the hospital unless someone's maybe moving more towards discharge, and maybe in some advanced heart failure units, they're using those.

Dave: That's where I'm seeing them is the patient that's got heart failure, and would benefit from one of those medications, being started on it before probably close to before they go home.

Matt: Yeah. The rest of these meds, let's say that this person, let's say Enzo, for whatever reason, we're going to have to send them to a facility and they're waiting, but they're now eating and they've recovered from their pneumonia. And they might they might be three days, like they're going to stay here the weekend. But they're otherwise stable. Is it your practice? Or, do you think it's reasonable to restart some of those oral meds or some of those chronic meds in the hospital and get them off the insulin just for patient comfort? And just--

Dave: Yeah.

Matt: Okay.

Dave: That's been my practice at EVMS and I think generally a lot of people do that too, more so probably than in the past.

Matt: Okay. So, to summarize for this first part here, we were sizing the patient up, the goals are going to matter based on how sick the person is and their life expectancy, all sorts of things. Like diabetes, as we were talking about ahead of time day, there's always like a billion factors. It's always complicated, it always depends on the person. That's why it's fun to practice diabetes in diabetes medicine, I think, because there's so many potential answers and ways to do things. Adam, what's next here?

Adam: Can I just ask one follow-up question on that. Dave, are there any medications that you will continue when someone's admitted to the hospital for a non-diabetes related reason, if they were on as an outpatient or situations when they're admitted that you would say, "Well, we'll just continue their outpatient meds?"

Dave: I think you could probably continue a DPP-4 inhibitor. They're pretty safe drugs, and it kind of depends on how the person looks. If they come into the hospital, their kidney function is fine, their liver is fine, they don't have anything really scary. I'm trying to think of an example of a patient that would come in and look that healthy that we would see, [laughs] but I mean, sometimes--

Matt: Yeah. [chuckles] Maybe they're getting the battery in their pacemaker changed and they had to [crosstalk] or something.

Dave: [laughs] There's definitely times when it's probably appropriate to continue a medication that as long as you think about the potential risks and it's probably safe, but generally speaking, I think most

folks would recommend stopping most non-insulin medications and using insulin. But, again, it's because of that flexibility.

Matt: I've seen people saying that there's ongoing trials with the GLP-1s, they look promising, but then you just worry so many patients in the hospital already have stomach upset or poor intake and I think that seems like it might be the limiting factor.

Dave: Yeah. And the DPP-4s don't really have that. So, that's one of the reasons, and that's why I would probably consider that one instead of the dulaglutide.

Matt: Okay. Adam, now, what's next for Enzo?

Adam: He's admitted to the service, he started on the antibiotics, and now we are figuring out how to treat his diabetes. So, we decided to start him on insulin and just for our general benefit, he weighs 90 kilograms. Before we actually talk about this specific regimen that we'll start him on, can you just walk us through the basic types of insulin? I get personally very confused about all the different short-acting, intermediate-acting, rapid-acting, ultra-rapid acting, long-acting insulin. So, if you could walk us through some of those, that'll be great.

Dave: There are so many insulins, and so many insulins that showed up in the sample closet, in the last couple of years. All kinds of new things. Insulin just celebrated its 100th birthday. The first injection was on January 11th, 1922, in Toronto General Hospital. And if you want to read a really great book about insulin, *The Discovery of Insulin* by Michael Bliss is a classic. If you're interested in the history of medicine, that's a fantastic book. It's a great story with some people that don't like each other and intrigue. [laughs] It ends with people sharing a Nobel Prize. And then two really great reviews of insulin that I recommend everyone read. One is by Emily Sims and Carmella Evans-Molina, and their colleagues that was published in Nature Medicine last year. And another is by Irl Hirsch and his colleagues that was published in Endocrine Reviews in 2020. They're both fantastic. They talk about sort of the physiology of insulin and the history of insulin and why all these different insulins exist.

Adam: We can link to those in the show notes too.

Dave: Awesome. So, basically you need insulin that can help you in three different ways. You need insulin that mimics the low level continuous basal insulin secretion from the pancreas that we see throughout the day. That insulin is supposed to suppress hepatic glucose production between meals and overnight, so you don't wake up with hyperglycemia. And you need to address postprandial spikes in glucose, so there's postprandial or mealtime insulin. And then third, you have to have insulin that can address high blood sugars or correctional insulin. Fortunately, in the hospital, our options are often somewhat limited, because you have what's on formulary, [chuckles] and that's what you're going to use. And you don't have to worry about the 100 different types of insulin that exist, but on discharge, that's a whole different story. And that's where the clinical pharmacy and the pharmacist really helps us and our patients tremendously. Again, planning ahead for when the person goes home, if you think they're going to be on insulin for the first time, work with the pharmacy to find out what they're going to

be able to afford, what's on their insurance plan, what their copay might be. Basically, in the hospital we use basal insulins, like Glargine.

Glargine has been around for 20 years. We'll use insulin detemir, which is 12-to-20-hour insulin. So, instead of lasting 24 hours, it lasts less time, it's often helpful in folks that have kidney disease where the insulin may kind of hang around longer and then for rapid-acting insulin for meals, we'll use insulin lispro, or insulin aspart, another older rapid-acting insulin because now we have rapid, rapid-acting insulin analogs too, but those aren't probably going to be on formularies in the hospital.

Matt: Yeah, probably not yet.

Dave: Mm-hmm.

Matt: With the insulin management, there're so many questions asked about this. Maybe we should start about, how do you size someone up like Enzo, 90 kilograms, was on four drugs at home, but no insulin. How would you think about this?

Dave: One of the things about Enzo is, he's on all these medications, but his A1c is 8.4. He's not doing great. He should probably have an A1c closer to 7.5. So, he's not well controlled on what he is taking, although I think the dulaglutide was recently started. So, we maybe haven't given it a fair shake, but he's probably going to need a fair amount of insulin while he's in the hospital. So, you don't necessarily need to be afraid, with a larger dose, just based on how much medication he's on, and the fact that his glucose values are still high, if he's taking it regularly. So, those are all important things to ask.

He's a big guy, he's 90 kilos, so he may need a little bit more insulin for that reason, he's sick. So, he has a lot of inflammatory cytokines in his body, which are going to increase insulin resistance that make him need more insulin, too. I always told the endocrine fellows, if anybody ever asks you a question, and you're trapped, and you don't know what to say, you could always say, "Inflammatory cytokines."

[laughter]

The other thing is binding proteins. [Matt chuckles] Well, maybe there's been a change in binding proteins, and that usually this is going to shut down in attending pretty quickly, because what are they going to say? There could have been a change in binding proteins. [laughs]

Matt: But what about the weight base? Do you subscribe to this weight base, you want to get a sense of what might be a total daily dose for this person? I've seen the ranges thrown out there. What do you think is because we want to be about safety, right? We don't want to cause a hypoglycemic event. So, if you did like the 0.2 to 0.3 units per kilogram, sometimes that number seems scary for someone that weighs 100 kilograms and hasn't been on insulin before, and you're giving them 20 or 30 units the first time they've ever taken it. What do you suggest to start?

Dave: We have order sets at our hospital that are weight based and that's exactly where they start. 0.2 to 0.3 units per kilo for basal insulin, and then 0.075 units per kilo of their mealtime insulin with each of

their meals three times a day. You can always give more insulin, it's really hard to take insulin away. So, if you start low that's fine, but just be ready to increase it. And you can feel more comfortable being more aggressive. I think there are two different times that you feel more comfortable being aggressive with insulin. One is seeing what's happening to that patient over time, but the other is just the more experience you have managing diabetes in the hospital. For residents that rotate with us, I really try to help them to feel comfortable with insulin dosing, to come up with a dose of what they think is right. And then I'll come up with a dose of what I think is right. And maybe we'll go in between and then see what happens to that person the next day, but make a conscious effort to say, "Oh, no, he did okay." Or, "She did okay with that amount of insulin." It wasn't too much or they needed more, or, "Dr. Lieb was totally wrong, and I was totally right, and that person got hypoglycemic last night, and I was right." So, that happens too.

Adam: Dave, this would be a good time just to talk about what the targets are for inpatient insulin. This is a favorite question of attendings like me, specifically to medical students on round. If you clarify what we're striving to see with our finger sticks?

Dave: This is a great story, I think, just in medicine and healthcare in general, certainly in hospital medicine. So, I started my endocrine fellowship in 2006, and at that point, we were living in a post Leuven world. So, Greet Van den Berghe, and her group at the University of Leuven in Belgium had published a series of really an incredibly influential studies in the New England Journal of Medicine, about patients specifically in critical care settings and the benefits of tight glycemic control in those settings.

The first study came out in 2001, the second study came out in 2006. Those studies really led to a huge change, I think, in how diabetes was managed in the hospital. In the first study was in patients in the surgical ICU, and basically keeping a tight goal of 80 to 110 versus a conventional goal of 180 to 200. The patients that were on the intensive arm did better. They were more likely to survive, they had less complications, everything was coming up roses, and everybody was like, "Oh, my gosh. We need to start tightening our glucose control for everybody." When the medical ICU study came out, five years later, wasn't quite as rosy, but it was still pretty exciting. People are like, "Okay, this 80 to 110 thing still kind of makes sense, maybe mortalities, just not that great for people in a medical ICU but maybe length of stay was changed a little bit."

The big critique of those studies was, its one center, University of Leuven, Belgium, that's it and Greet did things her way in that center, and then those studies. And that's where nice sugar came in, which was a multicenter trial that included patients that were both in surgical and medical ICUs. They randomized people to that Leuven goal of 80 to 120 versus more conventional therapy of less than 180. And lo and behold, the intensive therapy was associated with a higher 90-day mortality, compared to the conventional therapy, and six times the rate of severe hypoglycemia. Hypoglycemia, they required somebody to assist the person with their management, so everything started to shift back a little bit.

Currently, most guidelines and consensus statements, whether it's from ACE or the American Diabetes Association or the Endocrine Society, most recommend a fasting goal of less than 140, and a postprandial goal of less than 180 in most hospitalized patients. Uncontrolled hyperglycemia is

associated with longer hospitalizations and infections, and increased mortality. But inpatient hypoglycemia is very real and associated with significant morbidity. In patients that are at high risk for low blood sugars, higher targets maybe reasonable in those folks. That's kind of a long answer.

Adam: That was great.

Matt: It's great to have that background. I didn't know quite to that detail. I knew it was like bad things happen when we try to be more strict. The ADA puts out the standards for diabetes care in the hospital. The most recent ones, they have, I think it's both 16.5, they say, more stringent goals. 110 to 140 might be okay for some patients. Everyone's just wanting to avoid that hypoglycemia, and like we said most patients, I think, if you keep them even between 100 and 200, you're doing okay, for the most part, if you look at-

Dave: It's pretty impressive. [laughs]

Matt: -the hospitals I've worked in.

Dave: Absolutely.

Matt: Not a lot of bad things are going to happen if you do that for the near term.

Dave: No, for sure not.

[ad]

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[ad ends]

I wanted to just swing back to so because we went through it a little bit quick, but when we were estimating the total daily dose of insulin, we were saying, 0.3 units per kilogram would be basal. So, that for our 90-kilogram patient, that would be like around 30 and then you said that for the mealtime insulin, it would be 0.75. So, it's something like that or so maybe--

Dave: Yeah, the order set that we have is 0.075.

Matt: Oh, 0.075.

Dave: Yeah. The mealtime insulin, when you add it all up together three meals a day, should be about equal to the basal insulin.

Matt: Got it.

Dave: If you calculate out that they need 30 units of basal insulin, then maybe they need 30 units of mealtime insulin, 10 units with each of the meals, something like that. You can use that as a guesstimate. If the patient is on insulin at home, you can start from there and find out are they having hypoglycemia on those doses, is it too much and needs to be cut back? Is their basal insulin covering some of their meals? If it doesn't quite match up with how much they're taking for their meals and how much basal they're taking. They may be overbasalized, and you may need to cut back on that. Looking at what was going on at home and patients that are already on insulin can be incredibly useful too.

Matt: I see. If Enzo was on with 30 units at night at home and 10 units with meals, we would decide does this-- and how's he doing? Is he running hyperglycaemic all the time, maybe we don't need to change anything? But if he comes in and he's not eating anything, and he's had been having some lows, we might need to lower his home insulin. And you do like the 20% or something like that. Do you

have any just like rules of thumb that the audience can maybe think like, if someone's coming in, you want to lower the home insulin?

Dave: Yeah, 15% to 20% is fine. I don't know that that's based in any kind of hard science. It's the magic of endocrinology. [laughs]

Adam: And that's even with all those inflammatory cytokines floating around.

Dave: Well, I mean, it depends on how many inflammatory cytokines there are. I'm pretty sure that there's an assay, you can measure them so.

Matt: Yeah, so, yeah go ahead Adam.

Adam: For Enzo, he's 90 kilograms, his blood sugars at home don't seem very well controlled on four medications. What dose would you start him on if you're willing to do a little bit of on-the-spot math for our audience?

Dave: Yeah. I think it'd be reasonable to start him on 30 units of glargine as a place to start. Someone who's never been on insulin before, not really sure how good an appetite he's going to have in the hospital. If I'm using fixed doses of mealtime insulin, I might be a little bit more cautious. I may not jump to 10 units with each of his meals. I may use 5 or 6 units, and then kind of creep up, or insulin naïve, if I'm kind of nervous, I may start him on 20-25 units of basal insulin. Again, with the plan of increasing that, as I get to know the patient.

Matt: If he was somebody who's drinking tons of alcohol, we're not sure the status of his liver or if his kidney function was worse, or if he was underweight, some hypoglycemia risk factor you might do it that way.

Dave: Absolutely. Yeah, less insulin, if he's at risk for hypoglycemia.

Matt: Adam and I were chatting about this, I don't know why this happens, and maybe I just never understood it. But a lot of the standard order sets at places I've worked and I've worked a lot of places at this point, seem to have this four times a day correction scale. At bedtime, they're giving a rapid-acting insulin, even though the person's not eating. I just never understood that. When you read about it, it always says that the correction is given three times a day. Have you seen this where the order sets have a fourth correction?

Dave: Oh, yeah.

Adam: [laughs]

Dave: And I do not like it. I am with you all on this. In our institution, we don't give correction insulin at bedtime, although it still happens. Some patients are going to be high before they go to bed and would benefit from rapid-acting insulin. You may not give them that full correctional dose that you've got

ordered after meals. But if somebody's 300 before they go to bed, it may be because you were light on their basal insulin earlier in the day, because you were still getting to know them. And that's why it's important to follow up later in the day and see what's happened. We do that using the royal way because we have four fantastic endocrinology fellows at EVMS. And it's the fellows that are doing the chart checking later in the day and making decisions about adding that extra dose Lantus or giving a correction dose. Sometimes we'll put orders in the chart, if we're particularly concerned about somebody for the nurse to see regarding, "Hey, if the glucose is such and such at 9 o'clock, give us a call, because we may want to make some sort of an adjustment there."

Matt: I also saw some places saying, "You could maybe just start a basal and correction scale initially to get a sense of what it's going to be and then I guess you can always add a standing prandial dose of insulin. Is that something that you think is okay to do as well?

Dave: Absolutely. If somebody comes into the hospital and they've got a blood sugar that's particularly high, those folks probably aren't going to fly on basal insulin alone. If somebody's blood sugar's 250 when they hit the door, those people may need mealtime insulin in addition to basal insulin. But if they're pretty well controlled on a small number of oral medications, they're probably going to be fine with one injection of basal insulin and then correction. And you can always look to see how much correction they get throughout the day and add it in as mealtime insulin if you need to.

Adam: And let me ask you the flipside of this, Dave, because this comes up all the time. In training, we were always taught that sliding scale insulin or correctional scale insulin by itself is completely verboten. And yet, in the hospital that I practice in, and the other hospitals that I worked in, we see it all the time. I'm curious if you would recommend against this, is this never appropriate to use sliding scale insulin? I know the ADA recommends against it, but I'm curious to hear your thoughts.

Dave: Be still, my endocrine heart. Sliding scale insulin, I don't like the term "sliding scale," because historically, sliding scale insulin meant reactive inpatient glycemic control. Someone comes in, they've got type 1 diabetes, "I'll put them on a scale. If they go above 150, we'll give them one unit for every 50 over 150. Wait, they've got type two diabetes, make it two units for every 50 over 150." And so those people were hyperglycemic for their entire hospital stay and they got a lot of insulin that was really correctional insulin.

Matt: Based on the color of their urine or something like that, right, wasn't that the-- [laughs]

Dave: Yes. I can tell you a story about that--[crosstalk]

[laughter]

Dave: Maybe I will. When I was a medical student at UVA, there was a week where we had a different attending every day because our attending was out sick. One of the attendings was an older gentleman who was really, really well known for some of the rhinovirus studies that he'd done in Virginia. We were talking about the basal insulin and the mealtime insulin and making this adjustment and making another adjustment. And at some point, he just slammed his hand down on the table, and he said, "It used to be

so much easier before we did all these finger sticks. You just measure their urine, and you have figured out the dose of insulin in the morning, and you were done." And we were like, "We can't do that anymore."

[laughter]

Matt: The Journal of Hospital Medicine, ironically, this year had another article that came out and it was called something like inpatient glycemic control with sliding scale insulin in noncritical patients with type 2 diabetes who can slide. Well, this was August 2021. Ironically, because the JHM, also has the things we do for no reason which is give correction scale or sliding scale insulin as monotherapy. I think this was observational, so I don't know that this would be practice changing for you. Are you aware of that one? Or, had you seen that?

Dave: I think a retrospective chart review by the group at Emory in Atlanta. Emory, it's a pretty big well-known place for endocrinology, but especially for inpatient diabetes management. That's because the incoming president of the ADA, Guillermo Umpierrez is there. And Guillermo is one of my friends and has published just everything about inpatient diabetes that you can possibly imagine. He was the senior author on that study, but it was Guillermo's most work with the rabbit trials probably decades ago, that led to stopping using sliding scale and using basal bolus for patients, showing that it was more effective. But basically, they did a retrospective review of over 25,000 adults with type 2 diabetes. And they found that about 30% of them were being treated with sliding scale insulin only. If their blood sugar was less than 180, when they came into the hospital, about 85% of them did just fine. But if their blood sugar was high, greater than 200, greater than 250, the number of people that had successful glucose control based on their targets was less than 20%.

They recommended the cautious use of sliding scale insulin for certain patients with more mild hyperglycemia, which makes sense. And honestly, we do that, kind of similar, Matt, what you said. If there's somebody that comes in, it's not always wrong to put them on basal and correction, they don't need basal mealtime and correction insulin, but the key is we're calling it correction insulin and not sliding scale, ugh, sliding scale.

Matt: [laughs]

Adam: [chuckles]

Dave: What's most important about how we manage inpatient diabetes in 2022 versus the past is we're much more proactive about glycemic control and much less reactive. As long as people are thinking about it, and have a good reason for using correction insulin only rather than putting them on basal insulin or more, I think it's fine. You just have to watch how they do and adjust the next day.

Matt: Probably the wrong move is not to just keep boosting up the correction scale. If they're needing a lot of insulin, probably they need a basal added in and you can keep the correction scale too.

Dave: Exactly.

Matt: Do you recommend doing that?

Dave: Absolutely. The other thing is, remember that people with type 1 diabetes need basal insulin and mealtime insulin. It happens way too often that they don't.

Adam: Basically, Dave, what you're saying is that we should still take the liberty of trying to personalize these recommendations to our patients that come in. If someone has mild diabetes with well-controlled blood sugars, and are not on a lot of medications, and don't have that many inflammatory cytokines floating around, it might be appropriate to just do correctional insulin as long as we brand it that way, and that's a sliding scale.

Dave: Absolutely, and keep watching them.

Adam: Sounds good. Let's shift gears a little bit and talk about how to actually titrate insulin for Enzo while he's in the hospital. We started him on 30 units of glargine in the evening, and then five or six units with meals. Let's say his blood sugars over the next 24 hours ranged in the high 100s to low 200s range, we used a total of eight units of correctional insulin in addition to his mealtime insulin. How would you go about trying to better control his blood sugar's while he's in the hospital next day?

Dave: I always try to think about that, that 50-50 balance. How much basal insulin are they getting? And how much mealtime insulin are they getting? And is it relatively balanced for the most part? If I started off low on the mealtime, for whatever reason, because I was worried about how much he was eating or whatnot, but he's doing pretty good with the basal dose. He probably needs an increase in his mealtime if he's running high throughout the day. If he's going to bed with a high blood sugar, let's say he's 200 and he drops 100 points overnight, then I know he's probably getting too much basal insulin because he shouldn't be dropping that much. I would reduce his basal insulin. I tend to look at the correction insulin that's been given and try to divvy it up into the basal in the mealtime as necessary, kind of based on where I think it should go. But one of the key things with inpatient glycemic management is talking to the patient and talking to the patient's nurse because you can make decisions based on what you see in the chart, and there could be something from left field that you didn't know about, like, the friend brought somebody a Cinnabon-

[laughter]

Matt: Yes.

Dave: -to congratulate them on getting through their bypass surgery. They may not tell anybody about it, they may not tell the nurse, there may be an insulin order for snacks, whatever. And if they don't tell anybody, nobody knows. So, their blood sugar's 350 in the next morning, and they don't know why. So, you just have to keep asking, "Well, did you eat anything? Did you eat anything?" You have to be careful about it, because often the answer is, "Yes, I did eat something," or, "Gosh, I've had diabetes for 30 years, and I always have a snack at bedtime." That's a pretty common thing, because we used to use NPH insulin, which peaked overnight, so people [unintelligible [00:50:53], so everybody had a

snack at bedtime. But that's not really necessary anymore. You don't want to accuse people of overeating or kind of ruining your plans, you need to understand where they're coming from, and be gentle about the advice that you give, because they may have a really good reason for why they eat certain things at night. Or on the flipside, somebody could be getting tube feeds and their insulin is going and the tube feeds are held, and they have a low blood sugar. You have to pay attention to all of those different factors.

When I talked especially to the medical students, but also the residents and the fellows, I want to know what the patient's basal insulin is, what their mealtime insulin is, and what their correction insulin is. But I also want to know what their diet is, because that is just as important as the insulin in helping me to figure out what their blood sugars are doing and why they're doing what they're doing.

Matt: It can be hard to get a stable data set with the patient, their NPO, and then that day the patients, they ate a piece of chocolate cake that day, that's why they were running high and where they got a shot of steroid somewhere, which we'll talk about in a minute here. There're just all these factors that seem to happen in the hospital.

Dave: Are they got dialyzed? Or, they're just getting better. As they're getting better, they may need less insulin, they've had a surgery, they're recovering from the surgery, they're getting better, they're may be more active. One of the one of the lessons that I've learned over time, and that I try to teach is don't jump on a single episode. Unless it's a low blood sugar, like low blood sugar's you probably need to be more aggressive about adjusting insulin to try to prevent it. You don't want to see somebody drop to 32 days in a row before you make a decision to do something. But some people are going to have a day where they're kind of high, and you may throw your hands up and have no idea why they were high. And then the next day, they can get the same amount of insulin and do a lot better. This happens to people at home, too, and it's one of the banes of our existence having diabetes, is that you could do the exact same thing two days in a row, and have totally different blood sugars both days and never be able to explain it. In the hospital, it's rare that two days are the same, but give it a little bit of time. Look for a pattern, if you have time to look for a pattern before you make a change, because otherwise, you put people on a roller coaster, and nobody likes that.

Matt: Yeah. I guess, we don't really have hypoglycemia. We hadn't had planned on discussing it. But I'll just give you, let's say that he had a sugar of 55-- he got 30 units of insulin, he had a sugar of 55 one morning and they gave him some juice and he felt better. How might you adjust the basal insulin? Is it a 20% decrease? Or is it just sort of your gestalt?

Dave: The magic of endocrinology. 20% is a good number to go with, but you can also look at other things. Was this somebody who wasn't on insulin before they came in the hospital and wasn't requiring much medication and had an A1c of 6.5? That person, you might be pretty aggressive with cutting back their basal insulin, maybe again they're postop and they're getting better, and you just know that they're probably not going to need that much when they go home. Are they not eating anything? And that's part of the problem. Is there something else that's going on with their kidney function or some sort of GI issue? There are reasons why you might be more aggressive with reducing insulin.

What can happen sometimes is the insulin just gets held. And that's another like, "Argh," just call somebody before you just hold it completely. So, you don't necessarily want to hold insulin completely, but you may want to be pretty aggressive with reducing it depending on what's going on.

Matt: All right. We just tried to summarize what we talked about with this here. We had talked about way back that our pre-meal, we're looking for sugars under 140. That's what a lot of the guidelines say and postprandial under 180. We were saying that in general, you don't want any lows, you don't want high highs. So, if they're in that, I think, 100 to 200 range or 100 to 180 range, something like that, most people are okay, but we just talked about lowering by 20%, or something like that if they're having lows, because we want to avoid that. And we talked about, there's lots of different insulins, but generally patients are going to be getting a basal insulin. We talked about how to weight base dose that something like 0.2 to 0.3 units per kilogram, and we talked about, we might start them on a prandial insulin, or we might just start them on a correction scale to start with, and then figure out how much prandial insulin they're going to need. And then none of us liked the correction scale at bedtime as a standard, especially if the patient's not eating a nighttime snack.

Adam, anything I'm missing from that recap before? I know we have some other stuff we're going to talk about here with this case, but anything else I'm missing from that recap?

Adam: The other thing I would say is that when we're titrating the insulin usually using whatever the correctional dose is, and thinking about what's happened to the patient over the past 24 hours that may have explained some of the abnormal blood sugars. And if you can't come up with anything, then try to split that in a reasonable way between the long-acting and the pre-prandial insulin. Is that right, Dave?

Matt: It's a good point. A big part of what this is the patient's story, like, what happened? What did they eat? Did they actually get the insulin? And maybe we should ask about timing? I don't think we really talked about that. Now, I think sometimes you're not certain if the patient is going to eat or not. What do you think's the ideal time to time be short acting, the rapid-acting insulin that they're getting with meals?

Dave: Yeah, so the ideal situation is, you know exactly what they're going to eat and how much of it and you give them the insulin 20 minutes before. But, in reality--

Matt: So, that’s not going to happen.

Dave: That doesn't happen. Sometimes we'll put in an order that says, if the patient eats all of their meal, give them this much fixed dose insulin, if they eat half of their meal, give them this much. So that there's some wiggle room there. Oftentimes, the patients don't get the insulin until after they've eaten, which is not optimal. However, you may be kind of dependent on how busy the nurses are, and how busy food services is, whether the trays are coming up to the floor. And the last thing you want to do is give somebody a lot of insulin and then have the food not be there. Or, like you mentioned, the patient that's nauseated, maybe only eats a little bit or has gastroparesis and doesn't finish it. So, it's often reasonable to give people their insulin at the time that they're eating or after they're eating. It's not what we recommend in the outpatient setting. But for the inpatient setting, it makes a lot of sense.

Adam: Is there a standard definition of what the diabetic diet is, because I've had patients on a "diabetic diet," and have ordered sodas and other things that just seem to throw their blood sugars all over the place, and I'm curious if that's just an us thing at Kashlak Mid Atlantic or if that's an everyone thing?

Dave: The diabetic diet is carb consistent, so that people know they're going to get about 60 grams of carbohydrate per meal. And the problem with that is it doesn't necessarily prevent that person from asking for more things that also have carbohydrates. Unless, they have a nurse who's particularly thoughtful and kind of preventive that person may say, "Gosh, I'm really hungry still, can I have a snack?" And their snack can be a Lean Cuisine meal that's got another 60 grams of carbohydrate in it, and then they eat that and then it's like-- I love it when patients are like eating the cereal and eating the pancakes and then saying, "Why are you giving us this food? What kind of a diabetic diet is this?" You're eating it and it looks like it's a good diet.

Matt: I also think, within reason patients that-- they don't want to eat the diabetes friendly diet that's on the menu, and they say, "I eat at home the way you eat at home, so I want to eat that way here." Sometimes patients are really adamant about that. Within reason, I will try to say, "Hey, listen, you have a foot infection, and this may just be harder. Your sugar's run in the 300s, 400s, can we just do this just until we get things under control?" I try to negotiate. Sometimes patients if they're coming in, and diabetes isn't really that front and center, and we're just managing it, they'll be like, "Can I have a regular diet, and I will order it," because they're like, "I know what to order. I'm not going to go crazy." I just wanted to make that point as well. To give our patients credit, a lot of them are really savvy.

Dave: Oh, absolutely. And a lot of patients learn about carb counting and about carbohydrates while they're in the hospital. One of the things that our hospital does that I really like is on the menu, they have the carbohydrates listed for every food, so that when patients order things, they can see, and you should take the time to explain things to them. But I definitely do some detective work when I'm in the room, looking around, looking for bags of Skittles or empty bottles of soda, that might be around. I like what you said about negotiating, because people have to be comfortable, being in the hospital is not a fun experience for anybody and food is very comforting for people. So, you have to think about that too.

Matt: I wanted to give one more little twist to Enzo's case here before we talk about discharge planning for Enzo. Well, let's say that for whatever reason-- Well, let's say he also had COPD and also this pneumonia threw him into what we thought was a COPD exacerbation. He's wheezing a lot, not having fevers anymore. But we start on 40 milligrams of prednisone daily for the next five days. After the first 24 hour his glucose is just running in the 300s. Can you talk a little bit about that because it's so common our patients in the hospital are on steroids and need management of diabetes or steroid-induced diabetes?

Dave: Yes, steroids are a mystery. They tend to cause postprandial hyperglycemia mostly and it can be really difficult to predict how much insulin somebody's going to need when they get started on steroids. If somebody is getting a big whopping dose of steroids, like a stress dose, because they're septic, or if somebody has acute transplant rejection, they're getting ridiculous doses of methylpred. I'm pretty quick to use an insulin drip, because otherwise, it's going to be really hard to predict what they need, and

they're going to become pretty hyperglycaemic, especially if they're already on a fair amount of insulin when you start.

For someone who's never been on insulin, who has a relatively well controlled A1c, I might be more cautious. Sometimes I'm surprised and you think people are going to need a bunch of insulin and then they don't. So, you really have to watch people. One of the tricks that I like is using a little NPH with the dose of prednisone. NPH last about 12 hours, and it peaks halfway through after the injection. And the steroid effect kind of lasts about 12 hours from the morning to the evening. And it peaks because people tend to have their highest blood sugar around dinnertime. So, giving NPH can really help. There's this beautiful paper from endocrine practice in 2009, John Clore and Linda Thurby-Hay at Virginia Commonwealth University, just down the road from where I am. In that paper, there's a table and in that table, they explained how to determine the dose of NPH and this is the recommendation.

Let's say you're giving somebody 60 milligrams of prednisone like this guy. And to make the math easy, let's say he weighs 100 kilos, he's a pretty big guy. You take 100 for 100 kilos and you multiply it by 0.6. If it was 40 milligrams of prednisone, you would multiply it by 0.4. If it was 30 milligrams 0.3, etc. It seems to work pretty well. I don't know that it's an evidence-based thing or an experience-based thing. But again, a lot of insulin dosing is just trying to find a place to start and that's a way to come up with a place to start. This would be a total daily dose 0.6, like if they're on 60 of prednisone, you said it was 0.6 times 100 for 100-- Yeah, times their weighting kilos. But it's just to cover this steroid effect.

Matt: Just to cover the steroid effect.

Dave: Yes, if somebody is already on basal insulin and they're getting mealtime insulin, you may add some NPH on top of that to cover the steroid effect.

Adam: They may be on long-acting glargine plus mealtime insulin, and then you'd add on the NPH to cover the steroids?

Dave: Mm-hmm.

Matt: That just seems like a whopping dose, 60 units of NPH.

Dave: I probably wouldn't start with 60.

Matt: [crosstalk] 10.

Dave: I'd probably start with more than 10, but I would be cautious. But, again, it's really giving you sort of an idea of where to start from.

Adam: I've definitely used this trick before. And it seems like it works. When they're able to stop the steroids, they can stop the NPH as well, which is nice. Just to clarify, this is only with prednisone, correct? With other steroids like Dex or methylpred.

Dave: It's typically with prednisone. Other steroids that have a longer half-life, it may not be as effective. Typically, it's with prednisone or prednisone equivalents, but longer acting synthetic steroids, it may not be enough. In that patient, adjusting their basal insulin may be the way to go, that may help. The problem that you have to be careful about though, is with something like prednisone, the effect again, is going to mostly be to the day and then it's going to kind of drop off overnight. So, if somebody's on a lot of basal insulin or on glargine, and to treat the highs with the prednisone, you just increase their glargine, they're probably not going to be that well covered during the day, and they may get hypoglycemic the next morning. It's nice to be able to use NPH because you're taking advantage of the pharmacokinetics and dynamics of the drug to help you with covering the pathophysiology of the steroid high.

Matt: I think we should move on to talking about transitions for Enzo. For the audience, Dave's wearing a Super Endo shirt. It says "Super Endo" and then it has a Superman logo underneath it, which is fantastic.

Dave: This shirt was given to me by one of my friends in ACE, one of the organizations I'm really involved in, Beth Welch. 1Props to Beth for the Super Endo shirt.

Matt: Yeah, Beth sounds super cool. Beth, if you ever wanted to send me one, I wouldn't turn it down.

[laughter]

Matt: How are we going to transition Enzo, we've treated his pneumonia, we got him through, we gave him some NPH each day for the few days he was getting steroids and now he's ready to go home. He's wondering, "Am I going to be getting all this insulin at home as well?" How do you have that conversation with patients?

Dave: Yeah. I try to have it early. But, again, kind of going back to the first part of our discussion. If I think he's going to go home on insulin, then I need to start planting that seed early. I need to make sure that our amazing diabetes educators have time to come and show him how to use an insulin pen. The nurses on the floor may be able to show him how to give himself an injection, have him start giving himself some of the injections before he goes. If somebody's on a fair amount of insulin, if they're on mealtime insulin and basal insulin, they probably can need to go home on insulin, especially if they came in on three or four different medications and their A1c was greater than 8%. That person, you could argue probably would have benefited from some basal insulin to begin with. Maybe you could do the basal insulin and add back his metformin, and add the empagliflozin and add the dulaglutide, and see how he does. As long as you've got a good plan for follow up. I try to make it as simple as possible on discharge.

It's really hard when you're discharged from the hospital and you get a discharge summary that's got 10 million things in your paperwork, there's all these new medicines. You were there for your pneumonia, and that's really what you're concerned about. The diabetes is like a bystander. If you give people a really complex correction scale and complex instructions with mealtime insulin, and some sort of complex NPH titration, it's too much. And I think we've learned from some of our postoperative clinics,

patients come back, and often they're not doing some of those things. They go back to basics and what's easiest. So, making it as easy as possible for the person is important.

Matt: I think in primary care, that's where I spend most of my time, especially young patients that are new diagnosis, they get discharged on basal bolus insulin and metformin. And they are just like, maybe they're taking one injection a day, and they're taking the metformin and a lot of them are scared into really changing up their lifestyle. And they do okay. My cohost, Paul Williams, who's not here, he always mentions that the four times a day is a pretty rough thing, and especially for patients who were not on it before they came in. I like the idea with this guy. Maybe we would send them out on the basal, but he just started on the dulaglutide. So, maybe that's going to get him over the hump there. I'm noticing now he's on sitagliptin and dulaglutide which is usually-- probably should just be on the metformin.

Dave: I didn't want to say anything.

[laughter]

Matt: No, we should. I don't want people on those two agents, it doesn't make sense.

Dave: It's definitely something that I see folks that are on a DPP-4 and a GLP receptor agonist. And there have been some studies that have looked at whether there's any additional benefit, and there doesn't seem to be any benefit of the combination. The GLPs are so potent. And there's some potential increased risk for complications or side effects, GI stuff. I would go with the dulaglutide, as long as he was tolerating it.

Matt: We should point out to the audience who can't see. This gentleman was on a combination metformin/sitagliptin. It would be easy to overlook that and just add the GLP-1 agonist on top and forget that you would have to-- you should switch them over to the plain metformin.

Adam: I'll take responsibility for this prescribing, too. I'm a hospitalist. I don't do a lot of outpatient diabetes prescribing anymore.

[laughter]

Adam: So, I apologize.

Matt: It brought up a great point. We're going to send them out on metformin, empagliflozin, dulaglutide, and maybe the basal insulin, depending on probably we need a little bit more, like, how long has he been on that regimen at home? Do we think it had enough time? Or, do we think he's really going to need to go on the basal as well?

Adam: This is one of the things that I struggle with the most is when we're ready to transition patients out of the hospital, and get them good follow up with the primary care, but just deciding on what kind of insulin regimen to send them home on, if they've been on a decent amount while they're in the hospital.

I will often make a decision about whether it should be basal only or whether we think that they could do some mealtime or whether we think that they could do correctional scale as well with titration. But it seems very much just based on my guess about how well they'll be able to do this as an outpatient. And I struggle to explain that to the trainee sometimes. I'm curious if you have a better way to individualize that or to make those decisions.

Dave: Yeah. It all I think has to come out of the conversations that you have with the patient. You really have to take the time, sit down, explain to them. I've seen conversations where somebody will explain to the patient, "You're going to be doing insulin with each of your meals, you're going to be doing this basal insulin, this long-acting insulin, you're going to be checking your blood sugar four times a day." And then I'll step in and say, "So, you understand we're saying that you're going to be doing four injections of insulin a day." And they're like, "What?"

[laughter]

Dave: People are overwhelmed with all the information that you're giving them. So, you really have to make sure that that they're on board. And, honestly, a lot of times when we're discharging people or giving them discharge recommendations, everybody's busy, time to go in quickly, but I try to think about that person sitting at home with their 20-page document and trying to make sense of what they're supposed to do. Our nurse practitioners and the fellows and our residents do a really good job of making a handout for people, that's just focused on their insulin, printing it out, going back into the room after rounds, sitting down with the patient, taking the time, explaining it and going over it, answering questions that they have or that the family has, making sure they feel comfortable giving themselves injections, and making sure that they know how to reach us afterwards.

We'll often tell people, "Here's is our number. There's always somebody that's on call." Again, it's typically one of our beautiful, amazing endocrine fellows. And they get the call, and we know you were just in the hospital, and this is what the discharge plan was, and we can help you, versus sometimes if they call their primary care doctor's office, maybe they haven't done the discharge summary yet. They just don't know what's happened as well as the endocrine team does, or maybe the inpatient team does. We try to make ourselves as available to people as we can through that transition time, because it's a really hard time for patients, I think.

Matt: Yep. The follow up needs to happen soon, afterwards either with the endocrine team or with the primary care just to make sure that they're doing okay.

Dave: Exactly.

Matt: They got the supplies, because sometimes they go to the pharmacy and they can't get the medication. And there's a whole bunch of stuff that can happen there that can be bad. I saw a patient one time at Kashlak in the recent past that had been discharged. It had been like a month and they had not gotten their insulin, and they were seeing clinic and it was a month between the discharge. I imagine that's a common story at other places. It's not the first time it's happened to me. It was a patient who just wasn't plugged in yet. So, I think that's the tough thing when they're not plugged in.

Dave: Yeah.

Matt: For this first part of the talk, is there anything that you really wanted the audience to remember, like, one or two take home points, and then we're going to, of course, have a second part to this where we're going to get into more the insulin DKA and the more severe hyperglycemia, and some of the pumps and things like that?

Dave: Yeah. I think the key thing, again, is being proactive about the patient's care and their diabetes management, and being patient centered. Really hearing their story, hearing what they're doing at home, hearing what their barriers to care may be with respect to diabetes management after they leave. All of those things I think are key. It's basics of medicine. It's what we do, listening to the patient's story, but really focusing it down on what causes their blood sugars to be high and low and then helping them with that.

Matt: Yeah.

Adam: It's great.

Matt: People will rejoin us for part two, where we get even deeper into some severe hyperglycemia.

Dave: [chuckles]

[music]

Paul: This has been another episode of the Curbsiders, bringing you a little knowledge food for your brain hole.

Dave: Yummy.

Paul: There you go, your time to shine. [crosstalk] Get the show notes at the *curbsiders.com*. And while you're there, sign up for our mailing list to get our weekly show notes in your inbox. Plus, twice each month, you'll get our new Curbsiders Digest, recapping the latest practice changing articles, guidelines and news and internal medicine.

Matt: Yeah, Paul, I was going to let it go. If he didn't say yummy, there would have been no yummy.

[chuckles]

Paul: I was going to wait until somebody said something. I have all the patience in the world.

Matt: I think it's like that button in *Lost,* like if someone forgets to push it, something bad might happen.

[laughter]

Matt: Anyway, so we're committed to providing you with high value practice changing knowledge and to do that, we want your feedback, so please subscribe, rate and review the show on Apple Podcast or contact us at the *curbsiders@gmail.com*. Reminder that this and most episodes are available for free CME through VCU Health at *curbsiders.vcuhealth.org*. And I wanted to give a special thanks to our producers and writers for this episode, doctors Adam Barelski and Cyrus Askin, and to our whole team. Beth Garbitelli is our executive producer, with production and editing support from the team at Pod Paste. Elizabeth [unintelligible [01:18:53] runs our social media. Tima Karginov maintains our website, and Stuart Brigham composed our theme music. Until next time, I've been Dr. Matthew Frank Watto.

Adam: I'm Adam Barelski, Hospitalist Wizkid. And as always, our main Dr. Paul Nelson Williams. Thank you, and goodbye.

[music]