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MCB-PN in Practice: Key Considerations for Patient Selection and Delivery

Announcer:
You're listening to *GI Insights* on ReachMD, and this episode is an educational grant provided by Fresenius Kabi. Here's your host, Dr. Charles Turck.

Dr. Turck:
Welcome to *GI Insights* on ReachMD. I'm Dr. Charles Turck, and joining me to discuss how we can select patients appropriately for multi-chamber bag parenteral nutrition, or PN for short, is Dr. Phil Ayers. Not only is he a Clinical Associate Professor with the School of Pharmacy at the University of Mississippi, but he's also the Chief of Clinical Pharmacy Services in the Department of Pharmacy at Baptist Medical Center in Jackson. Dr. Ayers, thanks for being here today.

Dr. Ayers:
Well, thanks for having me. Excited to be here.

Dr. Turck:
Well, to start us off, Dr. Ayers, in what circumstances would multi-chamber PN be the best approach, or alternatively, contraindicated and not best? And how does a patient's status between stable and critically ill affect those considerations?

Dr. Ayers:
Multi-chamber bag is relatively new to us in the United States. They've been used worldwide for a number of years. So currently in the U.S., we have two options. We have a two-chamber bag, which is amino acid and dextrose, with electrolytes and without electrolytes. We also have a three-chamber bag that has amino acids, dextrose, and lipid as well. So it's nice to have those options. And we're seeing more and more of those options being available in the U.S. at different strengths. And I think down the road we'll see even more available for us here in the United States.

But in terms of looking at the use of these products, you mentioned the term stable. That's really important there, where we're being sure that these patients are hemodynamically stable before we initiate multi-chamber bags. When you look at the patient as a whole, we have to look at, can we meet the micro and macronutrient needs of the patient using a multi-chamber bag? So in other words, can we give enough protein and calories to these patients using a multi-chamber bag? That may or may not be the case, depending upon the patient. So for instance, if we have a patient with traumatic brain injury who has a nonfunctional GI tract, we may not be able to meet the caloric needs because they typically are higher in those patients. Or a patient that maybe has a GI fistula, we may not be able to meet those protein needs with the multi-chamber bag products that we have available in the U.S. I would also say for patients who have large electrolyte needs—maybe losses from the GI tract or a fistula, for instance—again, these multi-chamber bags may not be able to meet the electrolyte needs of those patients.

So when we think about a critically ill patient, are the needs higher? Are we doing indirect calorimetry, where we have a better idea of the caloric needs of these patients? So it may be that we're not even going to meet those with the current multi-chamber bags we have available in the U.S. And that may be a patient we need to compound parenteral nutrition for. But I would say that especially in institutions that aren't able to compound because of cost or lack of expertise in compounding, these are a viable and an excellent option for a lot of facilities such as that.

Dr. Turck:
And given the diverse range of multi-chamber PN formulations, would you walk us through the key patient-specific factors for selecting the most appropriate option?

Dr. Ayers:
Sure. Again, you have to look at both the macro and micronutrient needs of the patient. Oftentimes, we may not be able to meet the protein needs, for instance, in a fistula patient, who generally requires more protein. So we have to look at those things along with the caloric content as well. If a patient has electrolyte arrangements—for instance, say they're losing electrolytes from a fistula or NG to suction—in those type of circumstances, the multi-chamber bag may not be appropriate for that patient. We may not be able to meet those needs. And we're talking about primarily maintenance needs when we're talking about parenteral nutrition. So you have to take those things into consideration as well when you're looking at using these multi-chamber products.

Dr. Turck:
And zeroing in on the recent ASPEN guidelines for parenteral nutrition support therapy, how have they influenced your approach when considering a patient for multi-chamber PN?

Dr. Ayers:
Sure. First of all, I always think about, is the patient an appropriate patient for parenteral nutrition? So I go to those guidelines and think, are they going to benefit, whether it be compounded or multi-chamber in nature when we talk about parenteral nutrition. So are they going to be put on parenteral nutrition for at least five to seven days to derive any benefit from using this? So that's where I first start. And then I look at the overall caloric and protein needs that are going to be required based on the ASPEN guidelines. And so can I meet those needs of the patient using a multi-chamber bag? That's where I start, probably second in terms of, can I use a multi-chamber bag or not?

But those guidelines are excellent in terms of making sure that patients are appropriate for parenteral nutrition. We certainly want to use the gut, if we can. We want to use the GI tract. Really important that we do that. So just because a patient is not eating, doesn't mean they're necessarily a candidate for parenteral nutrition. So those guidelines have influenced our thinking in terms of the right thing to do for the patient. And if the right thing is parenteral nutrition, we go back and think, can we meet those needs of the multi-chamber bag? There's one term that we try not to use with these bags—we sometimes see that “premixed” term used, which is not really true because these multi-chamber bags are still parenteral nutrition. They're very complex. They have to be activated under aseptic conditions. And we also have to add other components, such as multivitamins and trace elements. And if we're using a two-chamber bag, we need to be sure that we're adding lipid emulsions to that regimen so the patients don't develop essential fatty acid deficiency.

Dr. Turck:
For those just tuning in, you're listening to *GI Insights* on ReachMD. I'm Dr. Charles Turck, and I'm speaking with Dr. Phil Ayers about selecting patients for multi-chamber bag parenteral nutrition, or PN.

So Dr. Ayers, once we identify an appropriate patient for multi-chamber PN, what are some of the most common risks or challenges associated with it that we should be aware of?

Dr. Ayers:
First of all, that we need to be aware that this is a very complex medication. It can have up to 40 or 50 components in it, so it can be harmful if not used appropriately. I always think about those patients who are at risk, for instance, for refeeding syndrome. So if they have electrolyte issues, such as their potassium or magnesium and phosphorus are being low, then we need to be sure we can correct those before we initiate. And then we need to initiate these multi-chamber bags like we would any parenteral nutrition that we're compounding. So we need to start at lower rates and increase them to their goal once their electrolytes are stabilized and their glucoses are stabilized as well.

One common error that we see is sometimes these are oftentimes treated as IV fluids. Maybe we're starting the rate too high in these multi-chamber bags, so we need to take that into consideration. Patients certainly are at risk for refeeding. We're worried about electrolyte abnormalities that may occur and hyperglycemia that may occur as well. All those things have to be taken into account before we initiate parenteral nutrition in these patients.

And then, are we monitoring the appropriate electrolytes and glucoses as well? Are we looking at things like their liver function test? Are we looking at all the potential factors related to that? Oftentimes, with parenteral nutrition, whether it's multi-chamber or compounded, people will think that increasing the liver function test oftentimes is multifactorial in nature; it may be due to lack of perfusion, it could be medication. I'm not saying the parenteral nutrition may not be contributing to that, but typically it's not just the parenteral nutrition itself. So all those things have to be taken into account.

And then another thing I think about too is length of therapy. Can I do this peripherally? Can I meet those needs peripherally? Or do I need central access? All those things certainly factor into the decision regarding multi-chamber bags and even starting parenteral nutrition as a whole.

Dr. Turck:
And as a follow-up to that, how can a multi-disciplinary team help address some of those challenges and ensure the safe and effective delivery of multi-chamber PN?

Dr. Ayers:
That's a great question. Unfortunately, we've seen the true nutrition support services lessen over the last few years. We don't see the number of teams that we did many years ago. But I think it's very important, whether or not we have a team, that we do have that multidisciplinary approach where, first of all, physicians are identifying those patients who are candidates for parenteral nutrition appropriately. Then we have the dietitians making that assessment of the patient, helping determine the protein and caloric needs of those patients as well. A pharmacist plays a huge role here, not just in compounding whether it's multi-chamber or a individually compounded parenteral nutrition, but also looking at other factors, such as central access and other medications the patients are on. We've had some newer products, especially lipid emulsions, introduced into the U.S. market. So the pharmacist plays a super important role there in determining whether or not other medications can be given with parenteral nutrition. Also, pharmacists can play a huge role in terms of the metabolic issues that can occur with parenteral nutrition, whether it's electrolyte in nature or glycemic in nature. The pharmacist can be a member of that team making potential interventions and suggestions related to controlling that patient's glucoses or making some interventions in terms of normalizing the electrolytes. I see that as a huge role for the pharmacist.

Then, we throw in nursing. We're looking there at not only the assessment of the line, but also line care, trying to reduce those central line infections, and looking at the appropriate administration of parenteral nutrition as well. If we're giving our lipid emulsion separately, are we infusing those over 12 hours, which is a CDC recommendation? Or are we cycling the patients, which we sometimes do, to give them a break so they're actually getting a 24-hour requirement over a shorter period of time? And the nurses who are going to be involved in that, do they understand how to cycle that patient and how to start at a lower rate, increase to a goal rate, and back down to a lower rate in terms of cycling? Those things are really important.

So make sure everybody's on the same page. And when we start talking about multi-chamber bags, also understand that every discipline within that PN process understands the role of the multi-chamber bags and that they need to be activated in pharmacy, by pharmacy, and by pharmacy personnel. That's really important as well, and if the nurses understand that if those aren't activated, then they need to intervene at that point. Errors can happen, and we have seen that in practice where the bag wasn't totally activated. So nurses really need to understand the purpose of these products, how they actually function, how they need be activated before use.

Dr. Turck:
And lastly, Dr. Ayers, are there any key takeaways you'd like to share on selecting or starting patients on multi-chamber PN?

Dr. Ayers:
Yeah, one thing I always like to discuss is that we need to respect these like we would any compounded parenteral nutrition. Oftentimes, because they are multi-chamber or commercially available, people see them not as harmful or potentially harmful as was one that's compounded. So it's really important that we understand that these are also parenteral nutrition products that we know that are deemed by the Institute for Safe Medication Practices as high-alert medication. We need to treat those in the same way we would a compounded product.

The other thing that comes to mind is that proper selection of the patients is really important. And these are not really premixed products like I mentioned before, so are we adding multivitamins, are we adding trace elements, are we adding lipid emulsion so this becomes a complete nutrition regimen? That's important as well. And then are we also monitoring all the factors that need to be monitored in terms of electrolytes and glucoses and administration of product? All those things need to be incorporated just like they would with a compounded product. So seeing these as parenteral nutrition is so important. We've seen some institutions and some individuals saying "This is a commercially available product, so I don't have to worry about some of the things I would in a product that's compounded," and that's not true. It is parenteral nutrition, so it should be respected in such a manner that it can be life-changing and life-saving for patients, but it also can be harmful if not used appropriately in patients. So all those factors need to be taken into consideration when choosing to add one of these products to your formulary. And the education of all those involved in the PN process is so important when you start adding a product like this to your formulary.

Dr. Turck:
Well, with those key takeaways in mind, I want to thank my guest, Dr. Phil Ayers, for joining me to discuss patient selection and safety considerations for multi-chamber bag parenteral nutrition. Dr. Ayers, it was great having you on the program.

Dr. Ayers:
Thank you, Dr. Turck. Appreciate it and enjoyed being with you.

Announcer Close

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