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Exploring the Use of Peptide-Based Formulas in Enteral Nutrition Therapy

ReachMD Announcer:
Welcome to *Clinician's Roundtable* on ReachMD. This medical industry feature, titled "Exploring the Use of Peptide-Based Formulas in Enteral Nutrition Therapy," is sponsored by Peptamen. Here's your host, Dr. Jennifer Caudle.

Dr. Caudle:
This is *Clinician's Roundtable* on ReachMD, and I'm your host, Dr. Jennifer Caudle. Joining me today to discuss the use of peptide-based tube feed formulas in the post-acute care or home care setting is Dr. Manpreet Mundi, who's a Professor of Medicine in the Department of Endocrinology at the Mayo Clinic College of Medicine and Science in Rochester, Minnesota.

Dr. Mundi, welcome to the program.

Dr. Mundi:
Thanks so much for having me.

Dr. Caudle:
Well we're delighted that you're here, so let's start with some background. Can you discuss how common home enteral nutrition intolerance is?

Dr. Mundi:
In terms of enteral feeding intolerance, we have a number of studies evaluating patients who are hospitalized or critically ill demonstrating that enteral nutrition intolerance is quite prevalent and can be seen in up to 30-40% of patients. Most commonly, the symptoms that patients report to us include gas/bloating, abdominal distention, nausea/vomiting, or diarrhea. Often enteral feeding intolerance leads to tube feeds being held and patients falling behind in terms of nutrition.

There is much less data available for the home enteral nutrition population. We recently completed a review of our patient population that included over 1600 patients on enteral nutrition at home.

We found that over 20% of patients reported symptoms of intolerance with the most common being, again, nausea/vomiting followed by diarrhea, gas/bloating, constipation, abdominal pain, and even reflux. So the overall prevalence of enteral feeding intolerance had improved from the 30-40% we see in hospitalized patients, but 1 in 5 patients on enteral feeding at home still reported symptoms of intolerance.

Dr. Caudle:
What are the steps involved for caregivers and patients who are dealing with home enteral feeding intolerance? And what are the possible outcomes if enteral feeding intolerance is not addressed?

Dr. Mundi:
There are a number of ways to address home enteral nutrition intolerance and they can largely depend on the symptoms the patient is expressing. As an example, in patients with diarrhea or constipation, adding fiber to the formula or using a fiber containing formula can be helpful. At times we may try and slow down the rate at which patients are providing their feedings.

However, in many cases patients continue to have intolerance despite these steps.

Unfortunately, the consequences of this intolerance can be quite significant because these patients are not able to meet their nutritional

needs which can pose further problems since many are already malnourished. Additionally, many patients end up presenting to their local emergency room or urgent care center for further work-up, which can be quite costly involving studies such as CT scan, endoscopy along with consultations with specialists such as gastroenterology.

Due to this, there is an urgency to manage these symptoms.

One option that has been quite successful for us has been to transition these patients to another formula such as a peptide-based formula.

Dr. Caudle:
For those of you who are just tuning in, you're listening to *Clinician's Roundtable* on ReachMD. I'm your host, Dr. Jennifer Caudle, and today I'm speaking with Dr. Manpreet Mundi about the management of enteral feeding intolerance with peptide-based tube feeding formulas.

So, Dr. Mundi, now that we have a better understanding of how enteral or tube feeding intolerance can impact patients and their caregivers, let's switch gears and focus on how semi-elemental, peptide-based tube-feeding formulas might help us address those challenges. Can you explain how this formula could help alleviate enteral feeding intolerance?

Dr. Mundi:
Unlike standard formulas which contain intact proteins, peptide-based formulas contain enzymatically hydrolyzed protein which increases the amount of di- and tripeptides. Normally, as part of our protein digestive process, intact proteins undergo denaturation followed by breakdown of the long amino acid chains by gastric and pancreatic proteases. In patients with altered anatomy or illness, this may not occur.

With a formula that's higher in di- and tripeptides, theoretically we can get better absorption of amino acids as there are transporters such as PepT1 that can help absorb di and tri-peptides. We also know that these oligopeptide transporters can be expressed in higher amounts in the small bowel and colon in patients with altered anatomy such as short bowel syndrome.

Another change to the ingredient list is the use of higher MCT. Just as with breakdown of protein, the digestion, absorption, and utilization of fats is also very complex. Fatty acids can be classified as short, medium, or long chain fatty acids depending on the number of carbons they contain. So as an example, medium chain fatty acids typically contain 6-12 carbons, whereas long-chain fatty acids may have 13-22. Most fats in our diet are present as triglycerides, which are typically three fatty acids bound to glycerol. As we all know, oil and water don't mix, so our bile salts help emulsify the fat into small lipid droplets. These lipid droplets are then acted upon by pancreatic lipase to break down the triglycerides into mixture of tri- di- and monoglycerides along with free fatty acids, which are then absorbed by the enterocytes. MCT on the other hand are more water soluble and can be readily absorbed.

After they are absorbed, long chain fatty acids are resynthesized into triglycerides and packaged into chylomicrons and released into our lymphatics where they enter the blood through the thoracic duct.

MCT on the other hand can go into the portal circulation and enter the liver and be oxidized. Even when the LCTs get to the liver, they have to go through the carnitine transport in order to enter the mitochondria.

So as you can see how using these ingredients especially with enzymatically hydrolyzed proteins yielding higher di- tri- peptides and higher MCT content can make a significant difference in helping us absorb and utilize nutrients enterally.

Dr. Caudle:
Now there are a few different peptide-based formulas available for clinicians to use. So what attributes of a semi-elemental formula do you take into consideration that would most benefit the patient? And are all peptide formulas the same?

Dr. Mundi:
This is a great point. Not all peptide-based formulas are the same. These formulas can differ in terms of their protein source, the hydrolyzing process and the amount of di- tri-peptides it yields. The formulas can also differ in terms of the carbohydrate source as well as the source of lipids including how much MCT is added. Again all of this can have an impact on tolerance. So it's very important for the provider to consider which formula they are using.

Dr. Caudle:
And based on your experience, how important is clinical evidence when determining which peptide-based product to use?

Dr. Mundi:

To me, clinical evidence is key and it's led to significant changes in our own practice. We recently conducted a review of our adult and pediatric home enteral nutrition population evaluating patients who had been placed on peptide-based formula including those who had been switched from a standard polymeric formula to a peptide-based formula due to symptoms of intolerance.

In this group we saw a significant reduction in the symptoms of intolerance such as nausea/vomiting, diarrhea, abdominal pain, and cramping. In fact, close to half of the patients after this transition became completely asymptomatic.

What was especially striking was the reduction in health care utilization. We saw the average number of patient-initiated phone calls, scheduled visits, and ER visits decrease.

The same exact results were found in our pediatric cohort including a significant reduction in health care utilization.

Prior to these results, I think I would try many different strategies to manage enteral formula intolerance often putting my patients through a lot. Including adding fiber, changing the rate, imaging studies, consults, you name it. I was under the impression that peptide-based formulas are expensive so let me try these other options.

We then conducted a study where we looked at patients who had been transitioned from standard polymeric formula to 100% whey, peptide-based formula between October 2018 and August of 2020.

We studied health care costs including inpatient care, outpatient visits, and ER visits for the 4-week period before the transition and compared that to 8 weeks after the transition. Similar to our other studies we saw that enteral formula intolerance symptoms decreased by 50% after the transition. However, what was shocking was how much overall cost and home enteral nutrition related cost decreased.

It seemed that both overall health care utilization cost and home enteral nutrition related cost increased the 4 weeks prior to the transition to peptide-based formula and then began to decline steadily. Looking at the numbers, the price of peptide-based formulas paled in comparison to health care utilization costs.

Now I'm much more likely to transition my patients to a peptide-based formula if they are intolerant to standard polymeric formula or to start them on a peptide-based formula from the very beginning if I suspect they have anatomy that will benefit from the ingredients in a peptide-based formula.

Dr. Caudle:
And we've certainly covered a lot of ground today, Dr. Mundi, so before we close, outside of managing or treating symptoms of documented intolerance, are peptide-based formulas indicated for preventing intolerance in any other specific disease conditions?

Dr. Mundi:
In addition to using peptide-based formulas for patients who are intolerant to standard polymeric formulas, we also have been more aggressive about their use in patients with high likelihood of intolerances such as those with anatomy or diseases that pre-dispose to malabsorption such as bariatric surgery, pancreatic insufficiency, status post Whipple, just to name a few.

Dr. Caudle:
Well, those are some great points to take with us regarding semi-elemental, peptide-based tube-feeding formulas. And as that brings us to the end of today's program, I'd like to thank my guest, Dr. Manpreet Mundi, for sharing his insights with us.

Dr. Mundi, it was great speaking with you today.

Dr. Mundi:
Thank you, Dr. Caudle. It was my pleasure.

ReachMD Announcer:
This program was sponsored by Peptamen. If you missed any part of this discussion, visit *Clinician's Roundtable* at ReachMD.com, where you can Be Part of the Knowledge.