REVIEW SUMMARY

Peptide-Based Formula: Clinical Applications and Benefits

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Introduction:

Enteral nutrition (EN) is a safe and effective mode of nutrition therapy for adult and pediatric patients who are unable to meet nutritional and fluid needs via volitional oral intake. This form of therapy is anticipated to have future increase in both the acute and post-acute care settings. Use of the gastrointestinal (GI) tract with EN has biometabolic advantages that lead to improved intestinal mucosal integrity, immune function and resolution of inflammation. In the critical care setting, there may be both cost and clinical outcome advantages of using EN versus parenteral nutrition (PN). Quality of life may also be increased with use of EN in people whose conditions may be associated with inadequate and ineffective oral intake. Nevertheless, long-term EN may be challenging for patients and caregivers. This manuscript review encompasses the complication of enteral feeding intolerance (EFI) in tube fed patients.

Enteral Feeding Intolerance (EFI)

A monumental challenge of EN delivery is incidence of EFI. EFI is typically characterized by GI intolerance symptoms of high gastric residual, nausea, vomiting, alteration of bowel movements, gastroesophageal reflux and/or abdominal pain that lead to interrupted or failed EN delivery. Mundi, et al, identified that 20.5% of home enteral nutrition (HEN) patients experience at least one symptom of EFI. Likewise, 1 in 3 adult critically ill tube fed patients experience EFI. In a retrospective study, > 50% of pediatric patients receiving HEN also experienced at least one symptom of EFI. Significant data is emerging to support the use of peptide-based enteral formulas (PBF) in patients who experience EFI with standard polymeric EN (SPF).

Benefits of Peptide-Based Enteral Formulas (PBF)

Commercial tube feeding formulas were introduced in the 1960s and largely replaced blenderized enteral feedings. SPFs contain intact protein that must be digested into amino acids and di-and tri-peptides for absorption in the epithelial cells, or enterocytes of the intestines. The late 1960s introduced the world, initially astronauts, to amino acid-based low-fat formulas that were used in space for low residue and easy absorption, and later found application in the GI-impaired patient. This led to the development of enteral PBF complete nutrition formulas wherein the protein is hydrolyzed to different degrees. Research showed that amino acids in the peptide form were more readily absorbed in the intestines than amino acids alone, through action of upregulated transporters such as PepT1. Use of whey proteins that have been enzymatically hydrolyzed may be critically needed in different diseases of the GI tract.

PBF also contain a significant amount of fat in the form of medium chain triglycerides (MCT) which is also readily absorbed in the GI tract without the need for pancreatic enzymes and lipolysis. MCTs may be transported through the portal circulation to the liver, where they can be used as an immediate source of energy.

Clinical Benefits: Acute Care

When EFI is present, transition to PBF may be a principal cost-effective intervention, especially in the following conditions:

- Critically ill patients receiving early EN with EFI
- S/P abdominal surgeries
- Critically ill with acute GI injuries
- Acute pancreatitis
- Critically ill children, also including those with severe pneumonia on mechanical ventilation

Clinical Care: HEN

Consensus recommendations suggest initial SPF usage in HEN. If an underlying condition associated with a malabsorptive condition is present, PBF may be chosen as the initial EN formula. Use of PBF in EN-intolerant patients may be associated with improvement in EFI, quality of life, EN experience and clinical outcomes.

Cost-Effectiveness and Healthcare Utilization

PBFs are typically more costly than SPFs. In the critical care setting, use of PBF to decrease intolerance can theoretically reduce cost of care by shortening ICU stay, if 7% or more of EFI can be avoided. Data has shown that when PBF is used to combat EFI, cost of care decreases, including costs associated with hospitalizations, ER visits, ambulatory care services and patient-initiated phone calls.

Conclusion:

EFI poses a significant challenge to optimal EN delivery in the acute and post-acute care space for patients, caregivers and healthcare nutrition providers. Individualized intervention aimed at preventing and treating EFI is necessary. The use of managing EFI with PBF is supported by the scientific literature. Prevention and management of EFI with the use of PBF can be cost-effective, as it is associated with reduction and healthcare utilization and cost. In clinical practice, further research is needed to determine the best type of PBF and associated utilization.

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