Int. J Med. Pharm. Res. (P-ISSN: 2958-3675 | E-ISSN: 2958-3683)
Available on: https://ijmpr.in/

International Journal
of Medical and Pharmaceutical Research

CASE REPORT **OPEN ACCESS**

Nutrition and Polytrauma: The Role of Peptide-Based High Calorie, High Protein in Early And Effective Wound Healing

Komal Sawant; PGDD, CCN, ICNSC, FNBC, CDE[1]*, Aishwarya Joshi; PGDD, CDE[2], Nidhi Singh[3]

[1]RegisteredDietitian, Department of Nutrition and Dietetics, Krishna VishwaVidyapeeth, Karad,Maharashtra, India
[2]Department of Nutrition & Dietetics, Krishna VishwaVidyapeeth, Karad,Maharashtra, India
[3]Krishna VishwaVidyapeeth"Deemed to be University", Karad, Maharashtra, India

OPEN ACCESS

***Corresponding Author**
Komal Sawant

Registered Dietitian, Department of Nutrition and Dietetics, Krishna Vishwa Vidyapeeth, Karad ,Maharashtra, India

Received: 03-07-2024
Accepted: 04-09-2024
Available online: 09-09-2024

A B S T R A C T

Inadequate initial trauma management might result in a high fatality rate. Moreover, unexpected injury results in changes to metabolism, inflammation, and haemodynamics. Enteral nutrition (EN) is strongly advised as a feeding access method rather than parenteral nutrition (PN) according to the American Society for Parenteral and Enteral Nutrition (ASPEN) standards. Enteral tube feeding is now the most widely used technique of providing nutritional support for critically ill individuals due to significant advancements in enteral formulations over the past several years. Formulas based on peptides comprise proteins that have undergone hydrolysis to yield peptides of different lengths. Here, we describe a patient's experience receiving postoperative intensive care unit (ICU) care while receiving dietary therapy. Enteral nutrition (EN) was not started for more than two weeks, despite the patient's lack of malnutrition at ICU admission. The present case study underscores the significance of nutrition interventions for critically ill trauma patients who are at increased risk of malnourishment. It demonstrates the efficaciousness of peptide-based high-protein, high-calorie, and appropriate nutrition therapy in meeting the patients' nutritional requirements and promoting prompt wound healing.

Keywords: Nutrition management in Polytrauma, nutritional formulations, peptide protein.

BACKGROUND

Nutritional support is an important, but frequently overlooked, aspect of the seriously damaged patient's treatment[1].Hypercatabolism after trauma may lead to acute protein malnutrition, ultimately resulting in failures. Nutrition support may prevent this sequence [2].Also, the link between nutritional status and clinical outcome in severely injured patients is confounded by systemic pathophysiological reactions to trauma, which can both affect and be affected by the patient's nutritional condition. Nutrition's impact on metabolic alterations and clinical outcomes in severely damaged trauma patients is so distinct and complex, although it is still poorly understood. More knowledge of these pathways could lead to a better understanding of nutritional status in severely injured individuals, allowing for the prevention of disease or injury-related malnutrition and its repercussions [3].Enteral tube feeding is now the most widely used technique of providing nutritional support for critically ill individuals due to significant advancements in enteral formulations over the past several years. Peptide-based diets, often known as "elemental" or "partially" or "semi-" elemental diets, are composed of hydrolyzed proteins that yield peptides of different lengths [4].Patients with both chronic and acute wounds, such as postsurgical wounds or pressure ulcers, require an increased amount of protein to ensure complete and timely healing of their wounds. Right nutrition support with adequate protein intake is essential to the successful healing of a wound [5].Appropriate nutritional support during treatment is critical to minimizing catabolic stress and loss of fat-free mass associated with negative nitrogen balance. It can also decrease the mortality and hospitalization duration. The American Society for Parenteral and Enteral Nutrition (ASPEN) guidelines also strongly recommend enteral nutrition (EN) over parenteral nutrition (PN) as a feeding access route. Because by using EN can utilize the nutrients more efficiently to preserve immune functions and prevent mucosal atrophy.

Case Study

23Y /M case of left lower limb crush injury with dislocated limb joint was presented at casualtydue to trauma, hit by a train while crossing the railway track (Image 1). On clinical examination, no evidence of head injury and no internal bleeding was noted. The patient had no comorbidities. After a detailed clinical case discussion, the patientwas considered for debridement and external fixation procedure. He was advised for split skin thickness graft from right thigh plus external fixation of left knee joint + debridement+ suture of small wounds. The patient was kept on the following medications:

- Antibiotics
- Hemorrheologic agent
- Painkillers
- Vitamin C

Image 1: Before Nutrition Intervention

The patient was severely underweight which was as per BMI (Body Mass Index) classification. Weight-73kg.Height-165cm.BMI-26 kg/m2. From biochemical parameters, his albumin was noted to be 2.3g/dL. Other blood test indices were 0.7mg/dL for Serum Creatinine, 4.9g/dL for total protein,0.4 mg/dL total bilirubin, 17mg/dL blood urea, 3.6mEq/L serum potassium, 132 mEq serum sodium, 7.2 g/dL for hemoglobin. As per the urine routine, no albumin or protein loss was observed. Clinical signs and symptoms were noted which included poor appetite, decreased oral intake, fatigue, and weakness.

Nutritional Management

***Oral diet*:**

Patient wasreferred to Dietitian after 15 days. As per diet recall, he was taking a soft diet without supplements, Energy= 1200kcal, Protein = 40g. While providing nutritional therapy to critically ill patients it is important to ensure that patient is meeting individual needs for macronutrients and with fluid fiber and micronutrients. To determine energy needs predictive equations were used.Indirect calorimetry is considered to be the gold standard but it is time-consuming and expensive.Proteins play asignificant role in the nutrition management of critically ill patients.The requirement of protein can vary from 1.5 to 2.5 kg per day based on the level of stress in the patient [6]. In the above case, After Nutrition Rehab reference, the dietitian successively switched to a high-calorie high protein soft diet withpeptide-based high-calorie high protein formula, he was prescribed 3 dosages of formula (50g per serve) with macronutrient distribution as follows:Energy= 2190kcal, Protein = 109g(1.5g/kg/body weight), Carbohydrate=329g, Fat =49g.After a week he was shifted to a full diet and continued on peptide-based high-calorie high protein formula. Post-discharge, the patient was followed up to check compliance, tolerance, and acceptability.

RESULT

After nutrition assessment, the patientwas found to acceptand tolerate oral feeds without major difficulty, hence nutritional intervention involved a high-calorie high protein soft diet along with Peptide-based formula. The patient well tolerated the formula without major complaints with respect to GI discomfort, palatability, allergic reaction, or any other clinical signs and symptoms. Patient-reported improved energy levels, and decreased fatigue within 3 days of intervention.His appetite and oral intake improved on the following consecutive days along with wound healing (Image 2). On weekly follow-up, the Patient's serum albumin and protein level depicted significant improvement, his levels

increased to 3.0 and 6.0 g/dLrespectively.After discharge,on OPD follow-up, patients'wounds showed timely and effective healing (Image 3) which contributed to a reduction in the length of hospital stay and improved medical compliance.

Image 2: Within a week of Nutrition Intervention

Image 3: On follow up

No serious adverse events were reported over the duration of3 months of usage of formulationsand no safety concerns were reported.

DISCUSSION

The process of healing a wound typically progresses through three stages: the creation of extracellular matrix, a proliferative phase, and an inflammatory phase. Failure in the following steps of collagen production and fibroblast proliferation might result from flaws in the inflammatory phase of the healing process. Leukocytes that create growth factors and clear the wound of debris are attracted to the inflammatory phase. Studies indicate that hydrolyzed peptide may play a significant part in the inflammatory stage of wound healing [7]. The primarypurpose of this case study was to assess the impact of peptide-based high protein formula in wound healing. Findings include timely wound healing, significant reductions in clinical symptoms, improved parental quality of life, and high caregiver acceptability. Although this is a small case study, without a control group, these findings, however, contribute to the understanding of the role of hydrolyzed peptides in the management of wound healing among trauma patients.

CONCLUSION

The case study highlights the importance of high protein, high calorie, and peptide-based nutrition therapy in meeting patients' nutritional requirements and enhancing their general health to facilitate an early recovery. Overall, this observational case study's findings show that a high-calorie, high-protein, peptide-based formula helps patients with severe injuries heal their wounds more quickly and improving serum albumin levels. However, a large multicentric study needs to be conducted.

REFERENCES

1. Todd, S. R., Kozar, R. A., & Moore, F. A. (2006). Nutrition support in adult trauma patients. *Nutrition in clinical practice*, *21*(5), 421-429. doi: 10.1177/0115426506021005421. PMID: 16998141
2. Biffl, W. L., Moore, E. E., &Haenel, J. B. (2002). Nutrition support of the trauma patient. *Nutrition*, *18*(11-12), 960-965.
3. Dijkink, S., Meier, K., Krijnen, P., Yeh, D. D., Velmahos, G. C., &Schipper, I. B. (2020). Malnutrition and its effects in severely injured trauma patients. *European Journal of Trauma and Emergency Surgery*, *46*(5), 993-1004. doi: 10.1007/s00068-020-01304-5. Epub 2020 Jan 23
4. Ibrahim, H., Mansour, M., & El Gendy, Y. G. (2020). Peptide-based formula versus standard-based polymeric formula for critically ill children: is it superior for patients' tolerance?. *Archives of Medical Science: AMS*, *16*(3), 592-596.
5. Ney, L., &Annecke, T. (2011). Ernährungschwerverletzter. Nutritional management of severely injured patients: Treatment between guidelines and reality, *114*(11), 973-980.
6. Ebaid, H., Abdel-Salam, B., Hassan, I., Al-Tamimi, J., Metwalli, A., &Alhazza, I. (2015). Camel milk peptide improves wound healing in diabetic rats by orchestrating the redox status and immune response. *Lipids in health and disease*, *14*, 1-10.
7. Powers, J., &Samaan, K. (2014). Malnutrition in the ICU patient population. *Critical Care Nursing Clinics*, *26*(2), 227-242. doi: 10.1016/j.ccell.2014.01.003. PMID: 24878208.