

## **Case report**

### **Nutrition Management with Crohn's Disease – Semi Elemental Hydrolyzed Whey Protein (HWP): A Case Report Study**

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**ABSTRACT** *Background and purpose.* Individual with Crohn's disease is at risk of malnourish. Case report aimed to describe the clinical practice on a Crohn's disease adolescence, presented with sign and symptoms of malnourished with the underlying frequent loose stool. *Case presentation.* A 16 years old, male adolescence patient with Crohn's disease, presented malnourished: weight-for-age and BMI-for-age were below the 5th percentile (underweight), and stunted (<5th percentile) for height-for-age; with frequent loose stool (5 times/day). A normal level of renal profile, blood calcium, phosphate, and magnesium level; except for a lower value of albumin (19 g/dL) and hemoglobin (10.2 g/dl) was shown. A total of 2400kcal with 62g of protein can be consumed by patient in a day; yet, patient still experience continuous of weight loss. During the hospitalization, oral nutrition supplementation with semi-elemental hydrolyzed whey protein was implemented, twice in a day; along with balanced, healthy diet. There was improvement shown on patient anthropometry measurement such as body weight (gained 7.7kg) and mid-upper arm circumference (increased 5cm on both left and right arm). There was also clinically improve on the frequency of loose stool (reduced to 2 times/day). *Discussion and conclusion.* Patient with Crohn's disease has high risk of becoming malnourish. As conclusion, malnutrition screening is recommended for early detection of malnourish and followed by a proper assessment and intervention with semi-elemental hydrolyzed whey protein to improve nutritional status.

**Keywords:** Semi elemental hydrolyzed whey protein, protein energy malnutrition, Crohn's disease, case study.

#### **INTRODUCTION**

Crohn's disease is related to a group of conditions named inflammatory bowel diseases (IBD) (1). The most common clinical symptoms are abdominal pain, loose stool, experience lethargy, loss of weight, fever, anemia, or lesions on the perianal (1). Complications of Crohn's disease comprising intestinal obstruction, fistulas, abscesses, anal fissures, ulcers, inflammation in other areas of the body, and malnutrition (1). Malnutrition arises in Crohn's disease when the incidence of poor oral intake, malabsorption, severe deficit of proteins, and outgrowth of intestinal bacteria occur (2). It was reported that the rate of malnutrition that occurs in IBD patients varies from 20% to 85% (3,4). And this was also reflected in patients' weight, where IBD patients experienced a weight loss of 70% to 80% (5).

Malnutrition is more severe in Crohn's disease as compared to other IBD due to it can affect any region of the digestive tract and is more common in children than in adults (6). Factors that imply protein energy malnutrition (PEM) in Crohn's disease consist of reduce in oral intake, underlying physiological causes that rise the problem of malabsorption, an increase in catabolism effects, and as well side effects from

different treatment strategies (2,7). It was also a rise in concern when deficiencies such as vitamin D, iron and trace elements happened in individuals with Crohn's disease (4).

Henceforth, nutritional care is essential as part of the treatments to prevent severe PEM and as well to optimize healthy growth and development, especially in children (6). Enteral nutrition (EN) therapy, either taken orally or prescribed through tube feeding, can help in optimizing or restoring the nutrients that had lost by an individual. There are three types of enteral nutrition formulas that are widely used in clinical settings – elemental, semi elemental, and polymeric amino acid (6). Among all these, semi elemental enteral nutrition can offer a better outcome to an individual with severe malnourishment given the peptides based amino acid and the medium-chain triglyceride that can ease nutrient absorption (7).

#### **CASE PRESENTATION**

##### **Medical History**

No known medical illness and past medical history.

##### **Nutritional Assessment and In-Patient Diagnosis**

A 16-year-old, secondary school Indian boy was admitted to the hospital with complaints of pain in the perianal area, swelling, lethargy, bleeding with discharge, and with loose stools after food intake.

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Upon assessment, the patient's height was 148cm, with a body weight of 25.8kg. Severe malnourished was reflected in this child as the weight-for-age and BMI-for-age were below the 5<sup>th</sup> percentile (underweight) and stunted (<5<sup>th</sup> percentile) for height-for-age. The patient shows a normal level of renal profile, blood calcium, phosphate, and magnesium level; except for a lower value of albumin (19 g/dL) and hemoglobin (10.2 g/dl). The patient then proceeded with a gastroscopy and colonoscopy procedure. The patient was then diagnosed with Crohn's disease complicated by a complex perianal fistula. The patient was referred to dietitian team for nutrition management in view of frequent loose stool and malnourished.

A dietary assessment recall was carried out with both the patient and the caretaker (mother). From the dietary assessment, the patient can consume a high calorie diet, an average of 2400kcal/day, with 62g of protein intake. There isn't any sign of a picky eater from this patient. According to the caretaker, the patient's appetite had improved after taking multivitamins from a primary care setting. Yet, there is still no increment in his body weight. Besides that, the patient also experienced very frequent loose stool every time after a meal.

A comparative standard dietary requirement of 80kcal/kg current body weight was prescribed for the patient. This requirement was calculated based on Dorothy's formula for failure-to-thrive. The protein requirement was calculated to be 62g – 77.4g/day.

Table 1. Anthropometry measurement

Weight (kg)	25.8kg
Height (m)	1.48
Body mass index (BMI) kg/m <sup>2</sup>	11.8 kg/m <sup>2</sup>
Weight-for-age	
BMI-for-age	< 5 <sup>th</sup> percentile
Height-for-age	

Table 2. Comparative standard dietary requirement

Dosing weight (kg)	25.8kg
Energy (kcal)	80kcal/kg (body weight)
Protein (g)	62g – 77.4g

**Medical Nutrition Therapy**

First Visit

After the nutritional assessment, in view of the underlying causes that leads to malabsorption from his usual diet intake, a balanced, semi elemental HWP enteral nutrition formula was prescribed for the patient as an oral nutrition supplement. The purpose of the enteral nutrition prescription is to provide additional calories and protein yet ease in absorption for his underlying Crohn's disease. This patient was prescribed 7 scoops of the enteral nutrition formula, twice per day.

Other than the prescription, the patient was also required to follow a balanced diet that consists of varieties of carbohydrates, proteins, vegetables, and fruit; but with lower usage of cooking oil preparation method and as well avoid sweetened beverages and foods.

Follow up

A total of 6 follow-up sessions were carried out with the patient and his caretaker upon his visitation to the surgical clinic department in view of his

logistic limitation. During these follow-up sessions, the body weight was weighed, and as well the measurement from both left and right mid-upper-arm-circumference (MUAC) as shown in Table 3 below. There was no biochemical data for revision as it was not reassessed by the surgeon. A simple and quick dietary assessment was also carried out. The patient can follow and consume the enteral nutrition prescription. A total of 7.7kg weight was gained by patient, and increment of 5cm in both left and right MUAC. For the stool frequency, the patient's caretaker claimed that there had been a reduction in the patient's loose stool as compared to the previous (from 5 times per day to 2 times per day); and will only trigger when the patient eats high fat food preparation (eg: deep fried) and spicy. The stool texture also improved from Bristol chart Type 6 to Bristol chart Type 4. The patient's caretaker also claimed that it was a big challenge for the patient when need to restrict from these food preparation choices. Follow-up sessions ended for the sixth time as the patient was scheduled by the surgical department after 1 year

Table 3. Body weight and mid-upper-arm-circumference during follow-up sessions

Number of follow-up sessions	Weight (kg)	BMI (kg/m <sup>2</sup> )	Mid-upper-arm-circumference (cm)	
			Left arm	Right arm
1	29.5	13.0	15	15
2	29.9	13.2	17	17
3	30.5	13.5	17.5	17.5
4	30.8	13.6	18	19
5	31.3	13.8	19	19
6	33.5	14.8	20	20

## DISCUSSION

This case study presents the nutritional issues of malnourished in the setting of Crohn's disease. We present a case of a 16-year-old teenage boy with severe malnourished due to underlying Crohn's disease, and an improvement in his nutritional status after starting with semi elemental HWP as nutritional management.

When the patient was diagnosed with Crohn's disease and referred to dietitian team for nutritional management, we decided to provide him with semi elemental HWP enteral nutrition formula. In this case study, the semi elemental HWP was associated with improvement in patient's nutritional status and reduced stool frequency, and improved stool texture.

According to the ESPEN guideline 2017, exclusive enteral nutrition is effective and is recommended as the first line of treatment for children and adolescents with acute active Crohn's disease (6). There are three different types of enteral nutrition formulas that are categorized based on their nitrogen size – elemental, semi elemental, and polymeric. Elemental enteral nutrition formula is a type of formula that can be easily absorbed by the body (8). They are made in the form of amino acids for the protein and medium-chain triglycerides (MCT) for the fat (8). Whereas semi elemental enteral nutrition formula, consists of peptides in different chain lengths and MCT (9,10) that helps in digestion, protect the intestine mucosal and better nutrient absorption (7). Polymeric, consists of whole protein with long-chain triglycerides that need further breakdown by our body for the nutrient absorption. Semi elemental enteral nutrition formula is more expensive than polymeric but has better taste preference when compared with elemental enteral nutrition formula (8).

Over the years, some studies looked into the effect of semi elemental formula in patients with Crohn's disease. This clinical evidence showed that semi elemental HWP is able to tolerate well by the patients in terms of digestion and absorption and results in weight gain and growth, aids in the anti-inflammatory process, reduction in mortality rates, and lower healthcare expenses (8). In addition to this, do not forget about the role of peptide based HWP. According to DeLegge (11), there were several possible benefits such as aids in nitrogen or amino acid absorption and usage, maintenance of intestinal homeostasis by mucosal barriers, reduction in the

passage of viable bacteria from the gastrointestinal tract to extra-intestinal sites, aids in visceral protein combination and supports the immune system.

A piece of promising evidence was also seen recently through a prospective observational study by Ferrero et al (12). In this study, the subjects underwent 12 weeks of nutritional management intervention by using semi elemental HWP. It was noticed that the subjects' body mass index and mean albumin levels improved, and a significant decrease in their Harvey-Bradshaw Index and as well the frequency of loose stools (12). They believed that hydrolyzed whey protein is one of the important sources of bioactive peptides, which participate in a wide range of biological processes, including intestinal anti-inflammatory activities.

Nutritional intervention had slowly become one of the alternative treatments as compared to conventional (medication) intervention. Studies have shown that nutritional management for Crohn's disease can be more cost-effective than traditional pharmacological therapies or surgery, as it can help in reducing hospital readmissions and healthcare costs while improving patient outcomes (13,14). One study published in the Journal of Crohn's and Colitis in 2017 found that exclusive enteral nutrition (EEN), a type of nutritional therapy, was more cost-effective than corticosteroids for inducing remission in pediatric patients with Crohn's disease (15).

## CONCLUSION

In conclusion, this case study highlights the importance of nutritional management in patients with Crohn's disease, particularly those who are malnourished. Semi elemental HWP can be an effective nutritional intervention for improving nutritional status, reducing stool frequency, and improving stool texture in these patients. The use of semi elemental HWP should be considered in nutritional management guidelines for patients with Crohn's disease. However, individualized nutritional management plans should also be developed for each patient, taking into consideration factors such as comorbidities, medication use, and dietary preferences. Overall, this case study emphasizes the importance of a multi-disciplinary approach in managing Crohn's disease, including collaboration between healthcare professionals such as dietitians, surgeons, and nurses

to ensure the possible care for patients. By implementing evidence based nutritional management strategies such as semi elemental HWP, we can help improve outcomes and quality of life for patients with Crohn's disease.

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