

Nutritional Management of Severe Malnutrition in HIV-TB Co-Infected Patients: A Case Report

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ABSTRACT

Background: Malnutrition is a global health issue associated with high rates of mortality and morbidity. Patients suffering from malnutrition are more susceptible to diseases due to compromised immune systems and often face prolonged hospital stays. Chronic infections like Human Immunodeficiency Virus (HIV) and Tuberculosis (TB) significantly contribute to malnutrition. Here, we report on the nutritional management of a patient with severe malnutrition due to an HIV-TB co-infection. **Case Description:** A 21-year-old male patient with HIV-TB infection, currently in the intensive phase of TB treatment, presented in a severely weakened state. Over the past six months, he had experienced a weight loss of approximately 10 kg. Confined to bed, he was unable to perform any activities. His total energy requirements were calculated to be 2300 kcal, including 115 grams of protein, 280 grams of carbohydrates, and 80 grams of fat. After six days of nutritional therapy, the patient showed clinical improvement, with an increase in appetite and a weight gain of 0.8 kg. At a follow-up 41 days later, the patient had gained a total of 2.5 kg and exhibited significant clinical improvement, along with better laboratory results. **Conclusion:** Tailored nutritional therapy, combined with effective patient education, can significantly improve the clinical condition of patients with HIV-TB co-infection. Proper nutritional management helps to minimize drug side effects, maintain overall health, and prevent complications that could exacerbate the patient's condition.

Keywords: malnutrition; HIV-TB co-infection; nutritional therapy.

INTRODUCTION

Globally, HIV-TB co-infection is a leading cause of mortality. According to recent data from the World Health Organization (WHO), HIV-TB accounts for approximately 30% of the 690,000 deaths worldwide. The prevalence of TB co-infection is significantly higher among people living with HIV/AIDS.[1,2] Malnutrition is a critical issue in patients with HIV-TB, requiring urgent attention and management.[1,2]

One of the primary factors contributing to malnutrition in HIV-infected individuals is reduced appetite, often caused by difficulties in swallowing due to infections like mouth ulcers or esophagitis caused by *Candida*. HIV weakens the immune system, thereby increasing the risk of TB infection.[3] HIV-TB co-infection can lead to anorexia, nutritional malabsorption, micronutrient deficiencies, and altered metabolism, resulting in significant loss of muscle mass and fat.[4,5] The immune response alterations due to malnutrition and TB co-infection with HIV further exacerbate the issue.

Malnourished HIV-TB patients face prolonged recovery periods and higher mortality rates.[4] Given the heightened risk of malnutrition in individuals with HIV/AIDS, comprehensive nutritional therapy that includes adequate macronutrients and micronutrients is essential. Such therapy is crucial for restoring and maintaining ideal body weight, enhancing immune function, and inhibiting disease progression.[5]

CASE REPORT

The patient was a 21-year-old male referred from the Pulmonology department for nutritional evaluation and management, with a medical diagnosis of pulmonary tuberculosis, HIV, and oral candidiasis. The main complaints were coughing up greenish phlegm and shortness of breath for three weeks, worsening four days prior to hospital admission. The patient also experienced fever one day before hospitalization, nausea, and difficulty swallowing. He appeared weak, pale, and reported a decreased appetite. Anamnesis revealed a 50% reduction in food intake over the past month and a weight loss of

approximately 10 kg over six months. The patient's psychosocial history included same-sex attraction. He was receiving anti-tuberculosis drugs every eight hours. Functionally, the patient was bedridden and unable to carry out activities.

On examination, the patient presented with moderate illness: GCS E4M6V5, blood pressure 130/80 mmHg, pulse 84 beats/minute, respiration rate 28 breaths/minute, and temperature 37.9°C. Anthropometric assessment showed a weight loss of 18.9%, an ideal body weight of 61.2 kg, and a BMI of 15.24 kg/m². Physical examination revealed white spots on the oral mucosa and muscle wasting in both legs. Laboratory tests indicated anemia (Hb 10.3 g/dL), lymphopenia (total lymphocyte count 0.75 x 10³/μL, lymphocyte percentage 10%), and a high neutrophil-to-lymphocyte ratio (NLR 8.2). Liver enzymes were AST 41 U/L and ALT 13 U/L. The HIV test was reactive, with a CD4 ratio of 0.24. Radiological examination confirmed pulmonary TB and pneumonia.

Nutritional management included a 2300 kcal diet with 115 grams of protein, 280 grams of carbohydrates, and 80 grams of fat, with a target intake of 80%. The patient was provided soft food, a Peptimune formula (200 kcal every 12 hours), virgin coconut oil (5 ml every 8 hours), Vitamin B6 (daily), Curcuma (1 tablet daily), Zinc (20 mg every 12 hours), and a Vitamin B complex (1 tablet daily). Adjustments to the diet were made based on the patient's condition and tolerance.

After six days of treatment, the patient showed clinical improvement, with an increased appetite and the ability to walk unaided. At a follow-up visit 41 days after starting treatment, the patient had gained 2.5 kg, with improvements in hemoglobin (11.4 g/dL), total lymphocyte count (21.4%), NLR (2.9), AST (21 U/L), and ALT (22 U/L).

DISCUSSION

Malnutrition poses a significant risk for individuals with HIV/AIDS. Nutritional therapy that provides adequate macronutrients and micronutrients is essential to restore and maintain ideal body weight, enhance immunity, fight infections, inhibit disease progression, optimize drug efficacy, minimize side effects, and improve quality of life.[6,7]

In the case presented, the patient had a BMI of 15.24 kg/m², a weight loss of over 10% in six months, reduced subcutaneous fat mass, and decreased food intake by more than 50% over one month. The patient's functional status was compromised, with reductions in total lymphocyte and percentage lymphocyte counts, and an increase in the percentage of neutrophils. These indicators confirmed a diagnosis of severe malnutrition. One of the primary causes of malnutrition in HIV-infected individuals is reduced appetite, often due to difficulties swallowing food because of infections like oral candidiasis or esophagitis caused by *Candida*, drug side effects, or depression.[6] In TB patients, elevated cytokine TNF-α correlates with

increased leptin, a hormone that suppresses appetite and causes a sensation of fullness.[7] HIV infection often leads to a decrease in skeletal muscle mass due to metabolic changes involving tumor necrosis factor (TNF)-α, growth hormone, insulin-like growth factor (IGF)-1, and testosterone.[8] Addressing these changes requires providing optimal macronutrients, and dietary adjustments should be made based on the patient's condition and tolerance, increasing gradually to meet total energy requirements.[9]

The patient also exhibited anemia, which can result from increased inflammatory responses in HIV-TB patients. Elevated IL-6 levels induce hepcidin production, which inhibits iron absorption, blocks iron release from macrophages, and interferes with the delivery of heme to erythroid cells, leading to anaemia.[10] Supplementation with Vitamin B complex, including B12, is crucial as it aids in hem synthesis and the remethylation of homocysteine into methionine, a process essential for DNA synthesis and red blood cell maturation.[11] Mild B12 deficiency can cause fatigue, pallor, and various hematological effects such as anemia, leukopenia, and thrombocytopenia, along with cardiorespiratory symptoms like shortness of breath and palpitations.[12]

The patient showed muscle mass loss in both extremities, which was managed by providing adequate macronutrients and a 200-kcal formula milk containing glutamine. L-glutamine, an amino acid in human muscle, plays a key role in protein synthesis and skeletal muscle growth.[12] Zinc supplementation at 20 mg every 12 hours was also administered. Zinc boosts CD4 T-cell counts in HIV-infected patients and plays a crucial role as a cofactor for numerous enzymes and in immune cell activation, vital for combating infections.[13,14]

Vitamin B6 (pyridoxine) supplementation is necessary during isoniazid (INH) therapy to prevent peripheral neuropathy.[15] Virgin Coconut Oil (VCO) was used as a supplementary antimicrobial agent, containing glyceryl monolaurate and lauric acid, which can enhance sputum conversion in TB therapy.[16] Curcuma was administered to prevent hepatotoxicity due to anti-tuberculosis treatment and to stimulate appetite.[17] Vitamin B1 (thiamin) is essential for carbohydrate metabolism and energy production. Once absorbed and converted to thiamin pyrophosphate (TPP), it plays a pivotal role in carbohydrate metabolism. [18]

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