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Case Report

Nutritional Therapy Based on ESPEN Guidelines in a Patient with Ascending Colon Non-Hodgkin Lymphoma Undergoing Chemotherapy with Decreased Oral Intake and Infectious Complications: A Case Report

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ABSTRACT

Background: Malnutrition is a frequent complication in patients with cancer undergoing chemotherapy due to increased metabolic requirements, treatment-related adverse effects, and infectious complications. Gastrointestinal disturbances such as nausea, dysphagia, and opportunistic infections may worsen food intake and increase the risk of malnutrition.

Case Description: A 66-year-old woman with ascending colon non-Hodgkin lymphoma undergoing the fourth cycle of R-CHOP chemotherapy was hospitalized with pneumonia, oroesophageal candidiasis, suspected pneumonitis, electrolyte disturbances (Na 129 mmol/L; K 3.2 mmol/L), and mild anemia (Hb 9.8 g/dL). Nutritional assessment showed a body mass index of 19.2 kg/m² with approximately 10.6% weight loss during the chemotherapy period, indicating a risk of malnutrition. Nutritional therapy was provided gradually as a high-energy, high-protein diet with targets of 2100 kcal and 70 g protein/day, in the form of blenderized meals three times daily, together with peptide-based enteral formula supplementation, additional virgin coconut oil, and zinc and vitamin C supplementation.

Discussion: Texture modification was intended to improve oral tolerance and minimize discomfort during swallowing, whereas the peptide-based formula was selected because it may be more easily absorbed when gastrointestinal function is impaired. The addition of virgin coconut oil as a source of medium-chain triglycerides provided energy that is rapidly metabolized without complex emulsification. Zinc and vitamin C supplementation was expected to support immune response, reduce oxidative stress, and accelerate the healing of mucosa inflamed due to infection and chemotherapy-related effects.

Conclusion: A combination of food texture modification, peptide-based formula, and rapidly absorbed energy sources is a rational strategy to maintain nutritional adequacy and prevent worsening nutritional status during chemotherapy.

Keywords: Non-Hodgkin Lymphoma, Chemotherapy, Malnutrition, ESPEN

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INTRODUCTION

Malnutrition is a common clinical problem in patients with cancer and is associated with increased morbidity, reduced tolerance to chemotherapy, impaired immune function, and prolonged hospital stay. The prevalence of malnutrition in patients with cancer has been reported to range from 30% to 80%, depending on cancer type, disease stage, and treatment. The main causes of malnutrition in patients with cancer include reduced oral intake due to anorexia, nausea, vomiting, dysphagia, and systemic complications such as infection, inflammation, and

metabolic alterations caused by the tumor or cancer therapy (Hosseini et al., 2025; Ministry of Health, 2019; Muscaritoli et al., 2021).

Non-Hodgkin lymphoma (NHL) is a lymphoproliferative malignancy arising from lymphocytes, mainly B cells, but it may also originate from T cells or natural killer cells. NHL may be indolent or aggressive and may manifest in nodal or extranodal sites. Clinically, NHL is often characterized by lymphadenopathy, fever, weight loss, and night sweats, although its manifestations depend greatly on the site of organ involvement. Indonesian data from 2022 showed approximately 16,175 new cases and 9,440 deaths, indicating that this disease remains an important issue in national oncology practice (Arends, 2024; Hosseini et al., 2025).

Gastrointestinal involvement in NHL is an uncommon but clinically significant extranodal manifestation. In ascending colon NHL, several physiological functions of the colon may be disrupted, particularly residual water and electrolyte absorption, fecal formation and propulsion, and mucosal barrier function. Under normal conditions, the colon, including the ascending colon, absorbs residual fluid and electrolytes, consolidates stool, and helps maintain luminal homeostasis. Patients may experience diarrhea, fluid and electrolyte imbalance, altered bowel habits, abdominal pain, decreased appetite, and impaired feeding tolerance. In more severe cases, complications such as bleeding, obstruction, or intestinal perforation may occur, all of which can worsen nutritional status and increase clinical morbidity (Arends, 2024; Hosseini et al., 2025).

Chemotherapy is the main treatment modality for NHL. However, chemotherapy regimens often cause gastrointestinal and systemic adverse effects, including nausea, vomiting, anorexia, mucositis, dysphagia, diarrhea, and fatigue. These adverse effects may significantly reduce food intake. In addition, chemotherapy-induced immunosuppression increases the risk of opportunistic infections, including oroesophageal candidiasis, which can worsen dysphagia and make oral nutritional intake more difficult. In patients with the combined effects of the underlying disease, decreased intake, and infection, the risk of malnutrition becomes substantially higher; therefore, structured, individualized, and guideline-based nutritional intervention is required (Arends, 2024; Hosseini et al., 2025).

Although malnutrition in patients with cancer has been widely investigated, previous studies have mostly focused on general malnutrition among patients with cancer or hematologic malignancies overall, whereas systematic reports on nutritional management in patients with colonic NHL and complex clinical conditions remain limited. Moreover, most reported nutritional interventions do not always refer to recent evidence-based guidelines such as those of the European Society for Clinical Nutrition and Metabolism (ESPEN), resulting in variation in clinical practice (Arends, 2024; Hosseini et al., 2025; Ministry of Health, 2019; Muscaritoli et al., 2021).

The present case describes an elderly patient with ascending colon NHL after R-CHOP chemotherapy who experienced decreased food intake due to a combination of nausea, dysphagia, diarrhea, and infection. Nutritional intervention based on ESPEN principles was implemented to improve energy and protein intake, support clinical recovery, and prevent the risk of malnutrition. This case is relevant

because it illustrates the application of nutritional therapy in an inpatient cancer patient with complex clinical conditions.

CASE DESCRIPTION

A 66-year-old woman with a history of ascending colon NHL diagnosed in September 2025 and undergoing R-CHOP chemotherapy presented to the emergency department on February 16, 2026, with progressive weakness for 3 days, nausea, decreased appetite, dysphagia, gum swelling, fever, cough, shortness of breath, and diarrhea. On initial examination, the patient appeared weak with signs of mild to moderate dehydration. Vital signs showed compos mentis consciousness (GCS E4V5M6), blood pressure of 96/63 mmHg, tachycardia (112 beats/min), axillary temperature of 39.5°C, respiratory rate of 36 breaths/min, and oxygen saturation of 93% on room air. Anthropometric examination showed a body weight of 42 kg and height of 148 cm. Nutritional assessment showed a BMI of 19.2 kg/m² with approximately 10.6% weight loss during the chemotherapy period, indicating a risk of malnutrition. The patient was diagnosed with pneumonia, oroesophageal candidiasis, suspected pneumonitis, electrolyte disturbances (Na 129 mmol/L; K 3.2 mmol/L), and mild anemia (Hb 9.8 g/dL). Management included supportive and symptomatic therapy consisting of fluid resuscitation, intravenous medications including lansoprazole, ondansetron, paracetamol, and methylprednisolone, intravenous antibiotic therapy with ceftriaxone, and intravenous and topical antifungal therapy with fluconazole and nystatin drops.

Nutritional therapy was given gradually as a high-energy, high-protein diet with targets of 2100 kcal and 70 g protein/day. Initially, the diet was given as soft food with minced side dishes three times daily, accompanied by peptide-based enteral formula supplementation at 2 × 150 kcal. During the first 2 days of administration, the patient had difficulty swallowing, and intake reached only 20% of the target. Texture modification was then performed using blenderized meals 3 × 200 kcal, along with gradual escalation of peptide-based enteral formula supplementation to 3 × 150 kcal on the third day, 3 × 200 kcal on the fourth day, and 3 × 250 kcal on the fifth and sixth days of hospitalization. Virgin coconut oil (VCO), 1 tablespoon three times daily, was added starting on the fourth day of hospitalization, together with zinc and vitamin C supplementation. Diet monitoring is shown in Figure 1. After texture modification, intake gradually increased to 50% of the target on day 4 and 75% on day 6, as shown in Figure 2.

The patient showed clinical improvement during 8 days of hospitalization. Fever resolved from the fourth day, gastrointestinal symptoms improved, and hemodynamics became stable. At discharge on February 23, 2026, vital signs were within normal limits, odynophagia had decreased, and oral candidiasis had improved.

DISCUSSION

Malnutrition is a common complication in patients with cancer, particularly in elderly patients and those undergoing chemotherapy. The etiology of cancer-related malnutrition is multifactorial and includes reduced oral intake, tumor-related metabolic changes, systemic inflammatory response, and adverse effects of cancer

therapy. A significant decline in nutritional status is associated with increased morbidity, risk of infection, reduced chemotherapy tolerance, prolonged hospital stay, and even reduced overall survival (Arends, 2024; Directo & Lee, 2023; Hosseini et al., 2025; Ministry of Health, 2019; Muscaritoli et al., 2021; Ravasco, 2019).

Patients with NHL involving the colon have a higher risk of malnutrition due to the combined effects of the disease and therapy. Gastrointestinal tumors can cause symptoms such as abdominal pain, diarrhea, nausea, decreased appetite, and dysphagia, which directly reduce energy and protein intake. In this case, the patient also experienced dysphagia due to oropharyngeal candidiasis, an opportunistic infectious complication in immunocompromised patients after chemotherapy. Dysphagia and pain during swallowing may cause a substantial decrease in oral intake, thereby increasing the risk of malnutrition (Chaundry & Ehtesham, 2022; Inciong et al., 2020; Vella et al., 2024).

The R-CHOP chemotherapy regimen is a standard treatment for NHL, but it has gastrointestinal adverse effects that frequently influence the patient's nutritional status. These adverse effects include nausea, vomiting, anorexia, mucositis, constipation or diarrhea, fatigue, and immune suppression that increases the risk of infection. Studies have shown that chemotherapy may lead to 5–10% weight loss over several cycles, especially in patients with gastrointestinal disturbances or dysphagia. In this case, the patient experienced a combination of nausea, decreased appetite, diarrhea, and dysphagia, making immediate nutritional intervention a priority (Arends, 2024; Hosseini et al., 2025; Ministry of Health, 2019).

Infection in patients with cancer, including community-acquired pneumonia (CAP), Pneumonia Severity Index (PSI) class III, and suspected pneumonitis in this patient, adds metabolic stress. Infection increases energy and protein requirements through inflammatory mechanisms, increased pro-inflammatory cytokines, and nitrogen loss. Therefore, patients with active infection require an intensive nutritional strategy to meet increased metabolic demands, preserve muscle mass, and support immune function. Appropriate nutritional intervention in patients with cancer can improve caloric and protein intake, reduce infectious complications, and improve clinical outcomes (Arends, 2024; Chaundry & Ehtesham, 2022; Directo & Lee, 2023; Hosseini et al., 2025; Inciong et al., 2020).

ESPEN guidelines recommend routine nutritional screening for all patients with cancer, followed by individualized nutritional intervention according to malnutrition risk and clinical condition. In this case, nutritional screening and assessment were consistent with ESPEN guideline principles for patients with cancer. ESPEN recommends that nutritional intake, weight change, and BMI be assessed routinely from the beginning (Cederholm et al., 2019; Kondrup et al., 2003; Ministry of Health, 2019; Muscaritoli et al., 2021). Screening was performed using Nutritional Risk Screening (NRS-2002), in which 3 of 4 parameters in this patient indicated impairment: reduced oral intake during the preceding week, approximately 10.6% weight loss during chemotherapy within 3 months, and BMI of 19.2 kg/m² (BMI < 20.5). After screening showed risk, assessment was performed according to GLIM criteria, which include phenotypic and etiologic criteria. The patient met criteria for moderate malnutrition, with 5–10% weight loss within 6 months and BMI < 20 kg/m²

for age < 70 years. The etiologic criteria were fulfilled by impaired food intake and absorption as well as disease burden/inflammation, namely cancer and infection. Nutrition impact symptoms identified in this patient included nausea, dysphagia, diarrhea, and active infection, all of which clearly contributed to the risk of malnutrition. Assessment of muscle mass, physical performance, and the degree of systemic inflammation should be added, as these were not performed in this case.

Energy targets for patients with cancer are generally 25–30 kcal/kg/day, whereas protein requirements are at least 1.0 g/kg/day, with adjustment up to 1.5 g/kg/day in patients with metabolic stress or loss of muscle mass. In this case, the patient, weighing 42 kg, was targeted to receive 2100 kcal/day and 70 g protein/day. These targets were adjusted according to clinical condition, including infection and dysphagia, to ensure adequate intake to support recovery. The nutritional intervention in this patient included a blenderized diet, oral nutritional supplements/ONS (Peptisol), and supplementation with virgin coconut oil (VCO) and micronutrients (zinc and vitamin C). Modification of food texture to blenderized meals was performed to improve oral tolerance, minimize discomfort during swallowing, and facilitate food consumption without increasing the risk of aspiration (Directo & Lee, 2023; Inciong et al., 2020; Martin-Gonzalez et al., 2023; Muscaritoli et al., 2021).

Peptisol is a peptide-based enteral formula selected because of its high bioavailability and easier absorption when gastrointestinal function is impaired, serving as oral/enteral nutritional support to help meet energy and protein requirements when usual oral intake is inadequate. ESPEN emphasizes that in patients with cancer who can still eat but are at risk of malnutrition, early intervention should include nutritional counseling, management of symptoms that interfere with eating, and the use of oral nutritional supplements. If oral intake remains inadequate, enteral nutrition is recommended. The selection of a peptide-based formula in this case was a rational clinical decision because the patient experienced dysphagia, nausea, diarrhea, and poor feeding tolerance; therefore, a formula that is easier to digest and tolerate was expected to support achievement of intake targets. However, it should be emphasized that ESPEN does not specifically recommend any particular brand or require peptide-based formula for all patients with cancer; the choice should be based on patient tolerance and individual needs (Delsoglio et al., 2025; Dingemans et al., 2023; Kaegi-Braun et al., 2021; Kühn et al., 2024; Muscaritoli et al., 2021).

VCO administration was used as an energy-fortification strategy in a patient with limited intake. As a source of medium-chain triglycerides, VCO provides energy that is rapidly metabolized and does not require complex emulsification. Clinically, the addition of energy-dense fat sources may increase caloric density without substantially increasing meal volume. In this patient, VCO use was relevant because energy targets were difficult to achieve using main meals and formula supplementation alone. ESPEN does not specifically recommend VCO as a standard intervention in patients with cancer. Therefore, its use in this case should be considered a local clinical rationale to increase energy density, rather than a specific guideline-based recommendation (Schönfeld & Wojtczak, 2016).

Zinc and vitamin C supplementation may support immune response, reduce oxidative stress, and accelerate mucosal healing in inflammation caused by infection and chemotherapy-related effects. However, according to ESPEN guidelines for patients with cancer, vitamins and minerals should generally be provided around routine daily requirements, and high-dose supplementation is not recommended in the absence of evidence of specific deficiency. ESPEN micronutrient guidance states that standard enteral nutrition of 1500 kcal/day should contain at least approximately 10 mg zinc/day and 100 mg vitamin C/day. In acquired zinc deficiency, oral elemental zinc at 0.5–1 mg/kg body weight/day may be considered individually, whereas vitamin C at 200–500 mg/day may be considered in chronic oxidative stress or malabsorption. In this patient, active infection, inflammation, reduced intake, and oroesophageal candidiasis provided a clinical basis for considering such supplementation. Thus, supplementation in this patient should be positioned as support to meet micronutrient needs and assist mucosal healing, while avoiding high-dose claims based on guidelines without evidence of deficiency (Muscaritoli et al., 2021).

Clinical outcomes showed that the patient's intake gradually increased from a very low baseline to approximately 1650 kcal/day. Although the full target of 2100 kcal was not achieved, this increase was sufficient to prevent further weight loss and support stabilization of nutritional status. This finding demonstrates the effectiveness of a structured, individualized, and guideline-based approach. Collaboration among physicians, clinical nutritionists/dietitians, nurses, and pharmacists enabled early identification of nutritional risk, regulation of a safe diet according to clinical needs, and close monitoring of patient tolerance to nutritional therapy. The combination of these strategies may improve patient adherence to nutritional intervention, reduce the risk of complications, and support the overall success of cancer therapy (Arends, 2024; Inciong et al., 2020; Kaegi-Braun et al., 2021; Vella et al., 2024).

Nutritional education for the patient should focus on maintaining intake during chemotherapy and recovery from infection. Education should include eating small but frequent meals, choosing high-energy and high-protein foods, continuing the food texture that is best tolerated, using ONS as recommended, and maintaining adequate fluid intake. Patients and families also need education on how to manage symptoms that interfere with eating, such as choosing soft or blenderized foods during dysphagia, avoiding foods that are too spicy, acidic, or rough while the mucosa remains painful, and monitoring daily intake. Because the patient is immunocompromised, food safety education is also important, including food hygiene, proper storage, and avoidance of foods with a high risk of contamination. This approach is consistent with ESPEN principles that emphasize nutritional counseling, management of nutrition impact symptoms, and the use of ONS as an initial step in nutritional therapy (Kaegi-Braun et al., 2021; Muscaritoli et al., 2021; Ravasco, 2019; Vella et al., 2024).

Periodic nutritional monitoring in this patient should include daily energy and protein intake, body weight, BMI, eating ability, symptoms affecting intake, hydration status, gastrointestinal function, and tolerance to ONS or enteral formula. According to ESPEN, after abnormal screening results, further assessment should also include muscle mass, physical performance, and the degree of systemic inflammation. In

inpatient practice, monitoring of intake and symptoms can be performed daily, whereas monitoring of body weight and evaluation of nutritional adequacy should be performed periodically according to clinical condition. In patients at risk of fluid loss or impaired absorption, monitoring of electrolytes and relevant laboratory parameters is also important to evaluate the response to nutritional therapy and the course of disease (Ministry of Health, 2019; Muscaritoli et al., 2021).

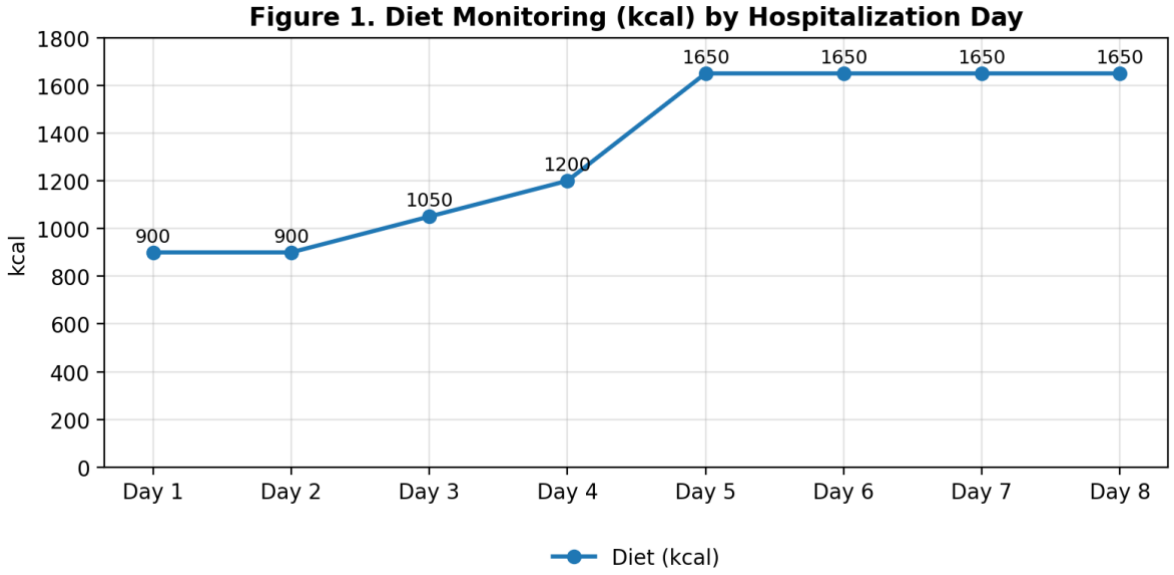

Figure 1. Diet monitoring (kcal) by hospitalization day.

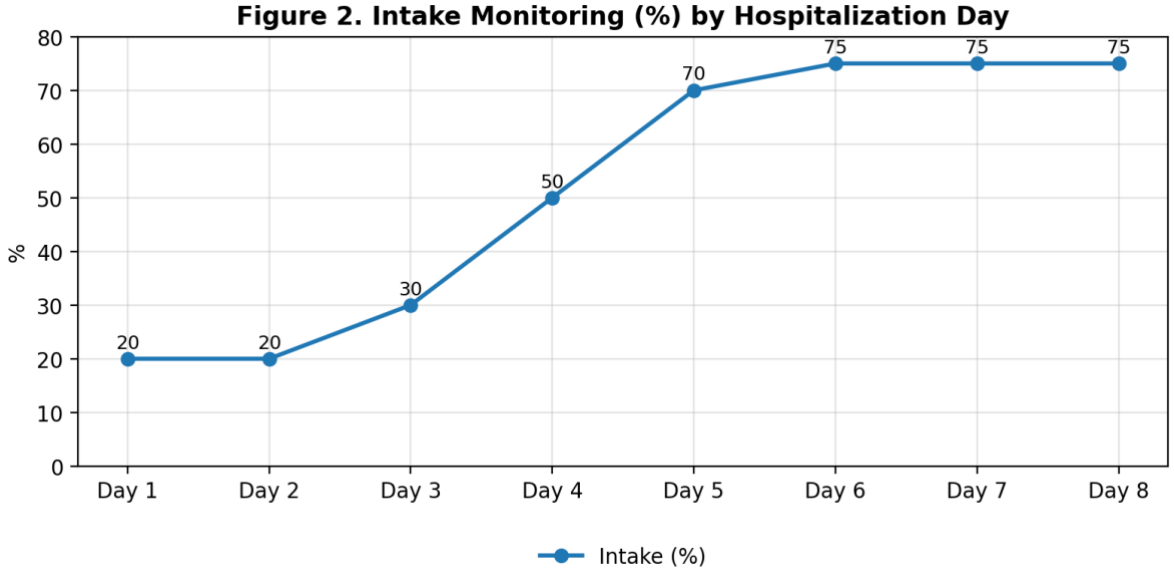

Figure 2. Intake monitoring (%) by hospitalization day.

CONCLUSION

This case emphasizes that patients with colonic NHL have a high risk of malnutrition, particularly while undergoing chemotherapy and experiencing infectious complications or dysphagia. ESPEN guideline-based nutritional intervention, including a combination of food texture modification, use of peptide-based enteral formula, and addition of rapidly absorbed energy sources such as medium-chain triglycerides, is an effective nutritional therapy in patients with cancer complicated by gastrointestinal symptoms and infection during chemotherapy.

Overall, the implementation of ESPEN guidelines in a patient with colonic NHL and complex clinical complications helped prevent progressive malnutrition, support immune function, and improve clinical outcomes. This case provides additional evidence that guideline-based nutritional intervention can be implemented safely and effectively in the inpatient setting, particularly in elderly patients at high risk of complications. Further studies are needed to evaluate the long-term effects of guideline-based nutritional strategies in cancer patient populations with similar clinical profiles.

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