

## THE ROLE OF EICOSAPENTAENOIC ACID SUPPLEMENTATION ON MUSCLE MASS IN MALNUTRITION PATIENTS WITH SQUAMOUS CELL CARCINOMA OF THE TONGUE: CASE REPORT

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### Abstract

The Indonesian prevalence of lip and oral cavity cancer in 2020 was 14,913, with 5,780 new cases. Head and neck cancer patients are very vulnerable to malnutrition; about 50% are malnourished, and 80% experience unwanted weight loss. Studies showed a significant effect of EPA as an anti-inflammatory substance. A 56-year-old female patient with a diagnosis of tongue squamous cell carcinoma (SCC) presents with the tumor removed along with some teeth. She is experiencing difficulty chewing food and had a weight loss of 8 kg (17%) in the last six months. The patient's muscle mass was 25.5% (low). Patients were given protein intake in the 1.1-1.8 g/kgbw/day range and EPA supplementation of 1.1 g/day. After one month, the BIA measurement showed that her muscle mass had increased to 26.2% and was in the normal category. Omega 3, especially EPA, improved body weight and lean body mass in cancer patients by modulating circulating inflammatory markers, demonstrating an inhibitory effect on inflammatory parameters related to muscle atrophy and lipolysis. Adequate protein intake and supplementation of 1.1 g/day EPA increased muscle mass in malnourished patients and enhanced the effectiveness of cancer therapy.

### Keywords

Eicosapentaenoic Acid, Skeletal Muscle, Malnutrition, Cancer

## Introduction

The prevalence of lip and oral cavity cancer in Indonesia reached 14,913, with 5,780 new cases according to data from Globocan<sup>1</sup> in 2020. Head and neck cancer patients are highly vulnerable to malnutrition, with around 50% of patients experiencing malnutrition and approximately 80% experiencing unwanted weight loss. Malnutrition in oral cancer patients is caused by various factors, including anorexia, difficulty chewing and swallowing due to tumor mass, and side effects from treatment modalities. Oral and oropharyngeal cancer patients are often malnourished.<sup>2,3</sup> The various treatment modalities for oral and oropharyngeal cancer include surgery, chemotherapy, radiation therapy, or a combination of both. Depending on the location of the cancer and the degree of invasion, it can cause pain, dry mouth, xerostomia, dysphagia, taste disorder, and decreased nutritional intake. Anorexia, caused by inflammatory cytokines of the cancer, exacerbates malnutrition. Weight loss and malnutrition can reduce functional capacity and affect their quality of life.<sup>4,5</sup> EPA supplementation improved body weight and lean body mass in cancer patients by modulating circulating inflammatory markers, demonstrating an inhibitory effect on inflammatory parameters related to muscle atrophy and lipolysis.<sup>6</sup>

## Case Report

A 56-year-old female patient diagnosed with tongue squamous cell carcinoma (SCC) was referred to the clinical nutrition clinic for medical nutrition therapy during chemoradiation. During her initial visit to the radiotherapy nutrition clinic, the patient reported having difficulty chewing and a reduced appetite. Her difficulty chewing food resulted from the removal of some teeth following the wide excision of the tongue tumor, leading to an 8 kg (17%) weight loss over the past six months. According to ASPEN criteria, the patient was classified as severely malnourished. Using bioelectrical impedance analysis (BIA) to assess body composition, her muscle mass was found to be 25.5% (low)

The patient was prescribed cyproheptadine at 1x4 mg to boost her appetite. Over time, her ability to tolerate feeding improved, allowing her to consume a total of 47 kcal per kilogram of body weight, with 1.8 grams of protein per kilogram of body weight daily. Her diet consisted of steamed rice, minced meat dishes, and oral nutritional supplements. However, the patient developed diarrhea after consuming cow's milk, leading to the switch to an oral nutrition supplement with plant-based protein. The patient was also given EPA supplementation of 1.1 g per day and protein requirements of 1.2 grams/kg bw/day. After one month, a BIA measurement indicated an increase in her muscle mass to 26.2%, placing her in the normal category. The evaluation of the patient's body composition can be seen in the table below.

**Table 1. Body composition Assessment with bioelectrical impedance analysis (BIA)**

	11 <sup>th</sup> April 2023	8 <sup>th</sup> May 2023
Skeletal mass	25,5 % (low)	26,2 (normal)
Fat mass	22,5% (normal)	21,6 (normal)
Fat-free mass index	14,8% (low)	15,3 (normal)
Visceral fat	2,5 (normal)	2,5 (normal)
Subcutaneous fat	19,2 %	19,2%

## Discussion

Patients with tongue carcinoma often experience reduced nutritional intake and muscle atrophy, both of which can impact the effectiveness of treatment and their overall quality of life. In our research, the patient reported decreased appetite and weight loss over the past six months. By supplementing with EPA and reaching a daily dietary protein intake of 1.8 grams per kilogram of body weight for one month, we observed an increase in muscle mass, which reached the normal range of 26.2%. The European Society for Clinical Nutrition and Metabolism (ESPEN) has recommended omega-3 or fish oil supplementation for cancer patients with severe malnutrition.<sup>4</sup> Previous studies showed the supplementation with either fish oil or EPA alone in patients with advanced cancer and cachexia may contribute to skeletal muscle preservation, improved appetite, and weight gain. EPA has the capacity to reduce inflammation and offers the potential to regulate nutritional status and body composition.<sup>7</sup> EPA supplementation improved body weight and lean body mass in cancer patients by modulating circulating inflammatory markers, such as tumor necrosis factor (TNF), interleukin-1  $\beta$  (IL-1 $\beta$ ), interleukin-6 (IL-6), and interferon-  $\gamma$  (IFN- $\gamma$ ), demonstrating an inhibitory effect on inflammatory parameters related to muscle atrophy and lipolysis.<sup>8,9</sup> the case showed EPA supplementation of 1-2 grams/day along with protein requirements of 1.2 grams/kg bw/day could increase the percentage of muscle mass in tongue cancer patients with malnutrition and is expected to enhance the effectiveness of cancer therapy.

## Competing Interests

There are no conflicts of interest in this study.

## Acknowledgments

This article was presented at the 8th International Conference and Exhibition on Indonesian Medical Education and Research Institute (8th ICE on IMERI) 2023, Faculty of Medicine, Universitas Indonesia. We are grateful for the outstanding assistance provided by the committee of The 8th ICE on IMERI 2023 throughout the preparation of the manuscript and the peer-review process.

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