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Laporan Kes/*Case Report*

Nutrition Management for Malnutrition in Underweight Older Adults with Low Rectal Adenocarcinoma

Pengurusan Pemakanan untuk Malnutrisi dalam Warga Emas Kurang Berat Badan dengan Adenokarsinoma Rektum Rendah

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ABSTRACT

Malnutrition in older adults is a complex issue with the risk of developing sarcopenia, frailty, and increased mortality. It is noticeable as weight loss or a low body mass index (BMI). A 75-year-old Chinese male patient with underlying low rectal adenocarcinoma under palliative chemotherapy was newly referred to a dietitian for underweight and malnutrition management. The patient experienced a weight loss of 4.1% in 1 month. His weight was 37.9 kg with a BMI of 13.9 kg/m2, indicating underweight for older adults. Besides, the patient has little space between fingers on the triceps and biceps, indicating subcutaneous fat loss and has mild prominent bones around the clavicle, shoulder, and patella area with mild to moderate oedema. The patient could consume orally an estimated energy intake of 66.6% (1199 kcal) from daily requirement but with a small amount of diarrhoea after every meal due to the side effect of low anterior resection with total mesorectal excision. To achieve short-term nutritional optimisation and ideal weight of 60 kg in 6 months, and long-term prevention of weight loss with preservation of fat and muscle mass, a nutrient- and calorie-dense diet was prescribed, along with dietary modifications to avoid spicy, fatty, or high-fiber foods that can exacerbate diarrhoea. A follow-up one week later showed a 2 kg weight gain and the successful addition of an extra meal, demonstrating the effectiveness of the nutritional intervention.

Keywords: malnutrition, underweight, weight loss, older adults, nutrition management

ABSTRAK

Malnutrisi dalam kalangan warga emas merupakan isu yang kompleks dengan risiko untuk mengalami sarkopenia, kelemahan, dan peningkatan kadar kematian. Ia dapay dilihat melalui penurunan berat badan atau indeks jisim badan (BMI) yang rendah. Seorang pesakit lelaki Cina berusia 75 tahun dengan adenokarsinoma rektum rendah yang sedang menjalani kemoterapi paliatif telah dirujuk kepada pakar dietetik untuk pengurusan masalah kekurangan berat badan dan malnutrisi. Pesakit ini mengalami penurunan berat badan sebanyak 4.1% dalam tempoh 1 bulan. Berat badannya ialah 37.9 kg dengan BMI 13.9 kg/m^2, menunjukkan status kekurangan berat badan bagi warga emas. Selain itu, pesakit mempunyai sedikit ruang antara jari pada trisep dan bisep, menunjukkan kehilangan lemak subkutan dan mempunyai tulang menonjol yang ringan di sekitar kawasan klavikula, bahu, dan patela dengan oedema ringan hingga sederhana. Anggaran pengambilan tenaga pesakit secara oral adalah sebanyak 66.6% (1199 kcal) daripada keperluan harian, namun pesakit mengalami sedikit cirit-birit selepas setiap kali makan akibat kesan sampingan reseksi anterior rendah dengan pengasingan mesorektal total. Bagi mencapai pemakanan yang optimum dalam jangka masa pendek dan berat badan yang ideal, iaitu 60 kg, dalam tempoh 6 bulan, dan pencegahan jangka masa panjang terhadap penurunan berat badan dengan mengekalkan lemak dan jisim otot, diet yang kaya dengan nutrien dan kalori telah syorkan, bersama-sama dengan pengubahsuaian diet untuk mengelakkan makanan pedas, berlemak atau tinggi serat yang boleh memburukkan

lagi keadaan cirit-birit. Susulan seminggu kemudian menunjukkan penambahan berat sebanyak 2 kg dan penambahan makanan tambahan yang berjaya, menunjukkan keberkesanan intervensi pemakanan yang diberikan.

Kata Kunci: malnutrisi, kurang berat badan, penurunan berat badan, warga emas, pengurusan pemakanan

INTRODUCTION

Older adults, typically defined as those aged 60 and up, are at risk of malnutrition due to various factors. This condition is particularly common among the older adults, especially during periods of acute or chronic illness, such as cancer (Lacau et al. 2018; Cereda et al. 2018). A rapid progression to malnutrition can occur from a combination of reduced dietary intake and the effects of catabolic diseases (Morley 2017; Agarwal et al. 2013). Malnutrition itself represents a significant geriatric syndrome, stemming from multifactorial origins and leading to severe consequences, including sarcopenia and frailty (Morley 2017; Cruz-Jentoft et al. 2010; Clegg et al. 2013).

According to the Global Leader Initiative on Malnutrition (GLIM) 2019, malnutrition can be diagnosed using three phenotypic criteria and two etiological criteria. The phenotypic criteria include weight loss of more than 5% within the last 6 months, or more than 10% beyond 6 months, low body mass index (BMI) of less than 20 kg/m² for individuals under 70 years, or less than 22 kg/m² for those over 70 years and reduced muscle mass, as indicated by validated body composition techniques. The two etiological criteria are reduced food intake or assimilation, defined as consuming less than or equal to 50% of the energy requirement for more than 1 week, any reduction for more than 2 weeks, or having a chronic gastrointestinal condition that adversely affects food assimilation or absorption and inflammation, which can be due to acute disease or chronic disease-related factors (Cederholm et al. 2019). The diagnosis of malnutrition is proposed to be based on the presence of at least one phenotypic criterion and one etiological criterion. Additionally, the guidelines on Enteral Nutrition in Geriatrics, published by the European Society of Clinical Nutrition and Metabolism (ESPEN), define clinical malnutrition as either weight loss exceeding 5% in six months, indicating a catabolic state, or a BMI below 22 kg/m², which signifies depleted physiological stores (Volkert et al. 2022). This study uses GLIM (2019) and Enteral Nutrition in Geriatrics (ESPEN 2022) as the reference guidelines.

The causes of malnutrition in older adults are commonly due to aging, chronic illness, and medication effects. The aging process brings about physiological changes that can significantly impact nutritional status. A decline in appetite, alterations in taste and smell and reduced ability to chew or swallow due to dry mouth are common age-related issues (Morley 2012). These changes often lead to reduced food intake and subsequent malnutrition (Norman et al. 2021). Furthermore, older adults have a higher risk of suffering from chronic illnesses like cancer (Estape 2018), which further exacerbates the risk of malnutrition. Moreover, certain medications commonly prescribed to older adults may have side effects such as nausea, vomiting or loss of appetite, further contributing to malnutrition (Kose et al. 2021). The common signs and symptoms that indicate malnutrition are unintentional weight loss, low BMI, fatigue and weakness and physical signs and symptoms such as swelling and dry skin.

The older adult in this case was diagnosed with low rectal adenocarcinoma. Low rectal adenocarcinoma is a type of cancer originating in the glandular cells of the lower rectum and is located at the lower end of the gastrointestinal tract. According to the study conducted by Wong et al. (2019), rectal cancer represents a substantial disease burden in Asia, with an overall incidence rate of 62.8 cases per 100,000 individuals, making it the second most common cancer in the region. Further stratification within Malaysia reveals a significant difference in incidence between ethnic groups, with the Chinese population exhibiting a rate of 27.35 cases per 100,000 compared to 11.85 cases per 100,000 in the Malay population. Low rectal adenocarcinoma often presents with a range of symptoms, including changes in bowel habits such as diarrhoea, as well as fatigue and weight loss. These symptoms will be the cancer treatment effect that causes malnutrition (Arends 2024). The impact of malnutrition on cancer patients is significant as it can weaken the immune system, impair wound healing, and reduce tolerance to cancer treatment (Bossi et al. 2022). Malnutrition can also lead to a decline in quality of life and increased morbidity and mortality (Soderstrom et al. 2017).

Surgical resection remains the primary curative treatment for low rectal cancer. The main goals are complete tumour removal with clear margins and, where feasible, preservation of sphincter function (Varela & Kim, 2021). The patient underwent a low anterior resection with total mesorectal excision, a procedure typically performed for tumours not involving the sphincter complex. This surgery removes the rectum and surrounding mesorectum, preserves the sphincters, and restores bowel continuity (Varela & Kim, 2021). Potential complications include anastomotic leakage and the possibility of a temporary or permanent ostomy that might lead to diarrhoea and malnutrition.

Beyond clinical metrics, effective nutrition care profoundly impacts a cancer patient's quality of life. By managing symptoms like nausea, appetite loss, and fatigue, it helps patients maintain their independence and overall well-being throughout their cancer journey. Therefore, early identification and timely nutritional intervention are crucial to mitigate the negative consequences of malnutrition in cancer patients. Specifically for an underweight older adult patient with low rectal adenocarcinoma, the primary goals of nutrition management include preventing further weight loss and achieving optimal nutritional status. These objectives are crucial for maintaining muscle mass, enhancing immune function, and improving overall quality of life.

CASE PRESENTATION

CLIENT HISTORY

The patient was a 75-year-old Chinese Male, married with three children. He was retired and lived with his wife and daughter. He was a non-smoker and a non-alcoholic drinker. The patient had underlying low rectal adenocarcinoma cT3cN2 and was undergoing palliative chemotherapy with Capecitabine 1000 mg twice daily. A potential side effect of this medication, which was administered during or after meals, was diarrhoea (Iacovelli et al. 2014). He completed his eight cycles of chemotherapy three months ago but claimed oral intake and weight have reduced since then. He had oedema even though his fluid intake was restricted to 800 ml per day. This was a new case referred to a dietitian for underweight and malnutrition management.

ANTHROPOMETRY DATA

The patient's weight and height were recorded upon visiting the dietetic clinic. His weight was 37.9 kg with a height of 165 cm, resulting in a BMI of 13.9 kg/m², which was categorized as underweight for the older adults according to Lipschitz (1994). Comparatively, his weight a month ago was 39.5 kg with a BMI of 14.5 kg/m². Patient experienced a weight loss of 4.1% (1.6 kg) in one month. His ideal body weight was 59.9 kg, corresponding to a BMI of 22 kg/m².

BIOCHEMICAL DATA

As for biochemical data, patient's renal profile was within the normal range. His total protein (67 - 71 g/l) and serum albumin (39 – 44 g/l) values were also within the normal range but he had a high total bilirubin level that increased from 25 µmol/L to 30 µmol/L in one month. The high total bilirubin was due to the diagnosis of low rectal adenocarcinoma. Nevertheless, the patient had normal haemoglobin level (132 g/L) as he is now on palliative care. The patient's red blood cell levels were lower than the normal range, 3.53 10^{12}/L. Patient also had low white blood cell 3.0 10^{9}/L. This might be due to a condition known as neutropenia, primarily because of cancer treatments such as chemotherapy and radiation.

MEDICATION HISTORY

Currently, the patient was undergoing chemotherapy palliative treatment, taking 1000 mg of Capecitabine twice daily, either during or after meals. The patient claims that he took the medication with milk tea in the morning. While he denies taking any supplements, he does consume one serving of Ensure Gold during lunchtime.

NUTRITION-FOCUSED PHYSICAL FINDINGS

The patient was present in the dietetic clinic with his wife. During nutrition-focused physical findings assessment, the patient reported no difficulties with chewing or swallowing, despite wearing dentures and had altered taste and dry mouth. However, the patient acknowledges a significant decrease in appetite since the onset of chemotherapy and persistent fatigue. Pedal oedema and dry skin were noted on patient's legs and hands. In addition, the patient reported having frequent small amounts of diarrhoea, up to ten times per day, especially after eating. The stools were described as soft and small in quantity, which worries the patient if he eats more. Furthermore, when the Subjective Global Assessment (SGA) was performed, the results showed several concerning signs. The patient had little space between fingers on the triceps and biceps, as well as a slightly dark circle under his eyes, indicating mild subcutaneous fat loss. The patient had a mild hollowing depression around the temple, prominent bone on the clavicle, shoulder, and scapula, poorly defined quadriceps and calf muscles, and a flat interosseous muscle between the thumb and forefinger. The patient was exhibiting signs of muscle wasting. The patient also had mild to moderate oedema observed on the legs. Therefore, the patient was rated to have SGA grade B, indicating moderately malnourished. In addition, the patient reported a sedentary lifestyle, spending most of his time sitting on the sofa and using an iPad.

DIETARY ASSESSMENT

The dietary assessment revealed that the patient had an estimated energy intake of 1199 kcal with 54.8% carbohydrate (164.2 g), 18.4% protein (55.2 g) and 24.5% fat (32.7 g). The patient is aware of his

restriction of fluid, 800 ml a day, and was trying to adhere the prescription. For example, the patient was not drinking soup from the soup-based noodles and was only using 190 ml of water to prepare his one serving of Ensure Gold milk. The patient also drank from a 250 ml water bottle daily. Patient was noted to eat hearty meals in the morning. During lunch and dinner, the patient typically consumed one serving of Ensure Gold (6 scoops) with bread and the meals consumed are usually homecooked by his wife. Patient's fiber intake was low as he consumes only 2 tablespoons of vegetables a day and rarely eats fruit. This low intake and irregular meal pattern, topped with fatigue, has resulted in a poor nutritional status for the patient.

NUTRITION DIAGNOSIS (ND)

The derived NDs for this patient are: 1)[New] Inadequate protein energy intake related to physiological causes increasing nutrient needs due to low rectal adenocarcinoma and loss of appetite due to chemotherapy [physiologic metabolic etiology] as evidenced by dietary history reported the estimated energy intake only achieved 66.6% (1199 kcal) from the energy requirement (1800 kcal) and the estimated protein intake only achieved 76.8% (55.2 g) from the protein requirement (71.9 g) and 2)[New] Underweight related to increased protein-energy needs due to low rectal adenocarcinoma on palliative chemotherapy treatment [treatment etiology] as evidenced by BMI 13.9 kg/m² (underweight) and nutrition-focused physical findings reported little space between fingers on biceps and triceps.

NUTRITIONAL INTERVENTIONS

The short-term nutrition intervention goals of the patient were to optimise nutritional status and increase weight to an ideal range of 60 kg within 6 months, while the long-term goal was to prevent further weight loss and to preserve subcutaneous fat and muscle mass. Given the patient's underweight status, an ideal body weight (IBW) of 59.9 kg (at a BMI of 22 kg/m²) was used for energy and protein intake estimations to prevent underestimation. Based on the ESPEN 2022 Clinical Nutrition and Hydration in Geriatrics guidelines, the energy requirement was estimated at 1500 to 1800 kcal/day (25-30 kcal/kg IBW/day). Similarly, protein requirements were set at 1.0-1.2 g/kg IBW, equating to an approximate daily intake of 59.9 to 71.9 g/day (Volkert et al., 2022).

The patient and his wife as the caretaker received nutrition counselling, which emphasised on the importance of a nutrient- and calorie-dense diet. A special emphasis was also made on a healthy balanced diet and to avoid irritants such as limiting spicy, fatty or high-fiber foods to prevent diarrhoea. To ensure adequate fiber intake, the patient was recommended to consume three servings of vegetables and two servings of fruit daily. To maximize energy intake, the patient was advised to eat small meal portions and frequently to allow for rest and breaks as needed. The patient was recommended healthy snacks in between main meals to achieve optimal nutritional intake. Additionally, the patient was encouraged to consume larger meals in the morning where he feels more energetic. This approach was aimed to counteract potential afternoon fatigue and ensure optimal nutrient absorption. This individualized approach, tailored to the patient's specific needs and preferences, was crucial for achieving positive outcomes and improving overall health.

Moreover, a calorie-dense diet such as adding fat like oil or butter into noodles, porridge, bread and rice was recommended to increase his caloric intake. He was also recommended to incorporate a variety of protein sources into his main meals such as soy milk, milk, fish, eggs, meat, chicken, tofu and tempeh, to alleviate malnutrition status. Furthermore, the patient's wife was encouraged to diversify cooking methods to stimulate the patient's appetite. Additionally, the patient was advised to take his medication with plain water instead of milk tea to optimise drug absorption and to replace condensed milk with full cream milk in their coffee and continue using his current oral nutrition supplement (Ensure Gold). To further optimize his nutritional intake, higher energy protein products like Supportan and Peptamen were provided as extra options. This is because Peptamen is a peptide-based formula, with its protein is in the form of hydrolysed whey peptides, can benefit patient with malabsorption due to cancer treatment like surgery while Supportan is a specialised oral nutrition supplement specifically formulated for cancer patients, especially those experiencing or at risk of malnutrition. Regular physical activity of static cycling, 15 minutes, thrice a week, was encouraged to help maintain muscle mass and overall health.
Patient was asked to weigh himself weekly and record diarrhoea frequency to monitor and evaluate his progress towards nutrition intervention. We also intend to schedule a follow-up session in three months to monitor this weight changes and evaluate his adherence to the dietary intervention. This ongoing monitoring approach will enable us to assess the patient's progress effectively and provide timely support and guidance.

OUTCOME AND FOLLOW-UP

There was a follow-up session conducted via a phone message one week after visiting the dietetic clinic. WhatsApp was used as the communication medium for the follow-up session and patient showed positive progress. The patient gained 2.1 kg

weight after one week with a new weight of 40.0 kg and BMI of 14.7 kg/m². While the frequency of diarrhoea was not recorded, the patient's dietary intake showed positive progress with an added afternoon snack to his diet. The snack includes a piece of meat-filled pau or a slice of bread with tea. Additionally, the patient was reported as willing to eat as much as possible during breakfast as he did not have fatigue in the morning. The follow-up indicated a notable increase in his protein-energy intake after visiting the dietetic clinic. Additionally, the patient also started light physical activity, static cycling twice a week for 15 minutes per session. Overall, these changes demonstrate his commitment to the interventions and potential for improved nutritional status.

DISCUSSION

The pathophysiology of malnutrition in underweight older adults involves various factors. These factors encompass advanced age, periods of acute or chronic illness where dietary intake is compromised, and disease states that inherently result in diminished food consumption (Cereda et al. 2018; Morley 2017; Agarwal et al. 2013). The patient in this case was 75 years old, male and malnourished. Advanced age itself predisposes to physiological changes, such as decreased appetite, which can contribute to inadequate nutrient intake. Furthermore, the patient's diagnosis of low rectal adenocarcinoma significantly exacerbates the situation. Cancer itself can lead to increased energy expenditure, altered nutrient metabolism and reduced food intake due to the side effect of fatigue (Van Soom et al. 2023; Knox et al. 1983).

Besides, the patient's clinical presentation aligns with the diagnostic criteria for malnutrition outlined in the GLIM (Cederholm et al. 2019). Specifically, the patient experienced a weight loss of 4.1% in one month, corresponding to the GLIM criterion of 5% weight loss within 6 months. His BMI of 13.9 kg/m² falls below the threshold of 20 kg/m² for individuals under 70 years, indicating undernutrition. The patient also presented with diarrhoea up to 10 times daily, which adversely affects food absorption. These symptoms were likely exacerbated by the diagnosis of low rectal adenocarcinoma and the patient's low fiber intake in his daily diet. This revealed that the patient fulfils the GLIM criterion of a chronic gastrointestinal condition as an etiological factor for malnutrition.

Moreover, the patient was categorised as SGA grade B. This classification was based on a comprehensive evaluation of the medical history of the SGA form, where the patient had decreased weight in the past two weeks before visiting the dietetic clinic, dietary intake was inadequate and was having diarrhoea. In addition, the physical examination revealed that the patient exhibited signs of subcutaneous fat loss such as a slightly hollowed look under the eyes and little space between fingers touch on the triceps and biceps. There was also evidence of muscle wasting observed such as slight depression on the temples, some protrusion and mild depression of the clavicle, shoulder, scapular, and knee, and noticeable depression and thinness of the quadriceps and calf muscles. Then, there was a sign of mild to moderate oedema in the patient's legs, suggesting potential fluid imbalances and further contributing to his compromised nutritional status. These findings collectively assessed using the SGA, provide strong evidence for the patient's mild to moderate malnutrition.

Older adult cancer patients who are malnourished have a significantly increased risk of mortality (Zhang et al. 2021). The severe impact of malnutrition on survival in older adult patients was underscored by a study showing a median survival of only 21.3 months for those at risk of malnutrition, while well-nourished patients' median survival remained beyond the study's timeframe (Sucuoglu et al. 2023). Therefore, to treat malnutrition in this patient, the primary nutrition intervention goals aim to optimise nutritional status, increase weight to an ideal body weight range and prevent further weight loss. By achieving these goals, nutritional interventions aim to significantly decrease the risk of mortality and improve the quality of life for older adult cancer patients.

To achieve optimal nutritional status, this patient was prescribed with nutrient- and calorie-dense diet to address his nutritional needs of high protein, high energy intake and help mitigate the consequences of malnutrition. Older adult individuals often have reduced appetites and lower caloric needs due to decreased physical activity. However, older adults who are underweight and diagnosed with cancer require sufficient calories to maintain energy levels and support bodily function by preserving subcutaneous fat and muscle mass. Therefore, a nutrient- and calorie-dense diet was prescribed, allowing the patient to consume more calories in smaller portions. Additionally, small and frequent meals intake allow the patient to maximise his energy intake. A larger meal was also encouraged to be consumed in the morning when the patient felt more energetic. This nutritional education was crucial for preventing further weight loss and promoting weight gain.

The strategy of incorporating a variety of protein sources into meals helps suppress muscle protein breakdown by providing essential amino acids, thereby maintaining a positive protein balance where synthesis exceeds breakdown (Carbone & Pasiakos 2019). Research indicates that consuming 25 to 30 g of high-quality protein per meal maximally stimulates muscle protein synthesis in both young and older adults (Paddon-Jones & Rasmussen 2009). Then, the patient initiated a light

physical activity routine, engaging in static cycling twice a week for 15 minutes each session. This could greatly help in stimulating muscle protein synthesis as light physical activities are essential for building and maintaining muscle mass, which tends to decline with age. Research indicates that even moderate intensity aerobic exercise can improve the quality of skeletal muscle in the older adults, contributing to better muscle health (Voulgaridou et al. 2023). Hence, the patient's combined efforts to increase protein intake and engage in regular physical activity were crucial steps toward improving muscle mass and overall health.

The follow-up session revealed a significant improvement in the patient's nutritional status. By incorporating simple dietary adjustments, such as adding a mid-afternoon snack (meat-filled pau or a slice of bread with tea) and increasing breakfast consumption, the patient experienced a notable weight gain of 2.1 kg within a week. Strong family support was crucial for this success. The patient's wife actively participated in the nutrition assessment, provided valuable insights, diligently documented recommendations and supported dietary changes. The patient's daughter also expressed willingness to explore the recommended oral nutritional supplement options. Crucially, the patient himself demonstrated a positive attitude and a commitment to adhering to dietary interventions. This collaborative approach, with strong family support and patient engagement, is essential for achieving the nutrition intervention goals. This positive outcome demonstrated the effectiveness of these dietary interventions in improving the patient's overall nutritional intake and contributing to a healthier weight.

Critically, while the initial weight gain is achieving, future improvements should focus on diversifying the patient's diet to ensure a broader range of nutrients. A limitation of this short-term follow-up is the inability to assess the long-term dietary adherence or sustainability of weight gain. Future efforts could also explore strategies to further enhance the physical activity level and consistent with dietary improvements. Challenges might include maintaining the patient's motivation over time and ensuring continued family capacity for support.

CONCLUSION

Older adult patients who are underweight, particularly those with chronic illnesses such as cancer are at heightened risk of malnutrition, a complex condition associated with sarcopenia, frailty, and increased mortality. Therefore, systematic screening for malnutrition risk is crucial in underweight older adults' individuals. Recognizing the signs and symptoms of malnutrition early allows for timely and targeted intervention, mitigating the adverse consequences on patient outcomes. A tailored nutrient- and calorie-dense diet, providing adequate protein and energy, should be prescribed to address the specific needs of underweight and malnourished older adults' patients. In addition to professional monitoring, patient education on self-monitoring of weight changes is vital for ongoing assessment of nutritional status and early detection of potential nutritional decline.

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