

CASE REPORT

Provision of Local Food Based Nutrition Support to Adenocarcinoma Rectosigmoid Pre-Surgical Patient

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ABSTRACT

According to ESPEN, surgical and cancer patients with high risk of malnutrition need to receive additional nutrition during the perioperative period. Most of the hospitals in Indonesia provide that through enteral food that is made of real food (homemade/non-industrial) for surgical patients. But this kind of enteral nutrition has several weaknesses. The development of enteral food has been done using local food that has complete nutrients and it can be given to surgical patients. This research aims to provide nutritional foods with high protein and antioxidants for malnourished recti cancer patients undergoing surgery. This product was made from local Indonesian food ingredients that is safe to consume and widely accepted by patients. The result showed that the effect of additional nutritional support through the formulated enteral food showed changes in the patient's nutritional status during the perioperative period. Also, the absence of postoperative complications indicates that this nutritional support is effective for surgical patients during the preoperative period.

Keywords: Nutrition support, Surgical, Adenocarcinoma, Local food

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Screening 2002 (NRS 2002) score >5 (2). Meanwhile, most hospitals in Indonesia only use albumin parameters <3.0 g/dl and BMI <18.5 kg/m² to assess the risk of malnutrition in patients.

INTRODUCTION

Adenocarcinoma rectosigmoid is a malignant tumor that forms in the epithelial tissue of the rectum and the second most common type of cancer after colon cancer. Several studies have shown that cancer patients are at risk of experiencing malnutrition due to the decrease in food intake, anorexia, nausea, and physiological treatments that interfere with maintaining nutritional adequacy. Also, the risk of malnutrition is also bigger in cancer patients undergoing surgery. Surgical patients who are malnourished are at risk for postoperative complications. Patients experience postoperative complications if they experience one or more signs of catheter infection, wound infection, wound dehiscence, heart failure, septic shock, and respiratory failure. Laboratory tests are included for hemoglobin and lymphocyte counts, and both are considered risk factors when found below the reference range(1). Therefore, nutritional support is needed as a nutritional intervention for malnourished pre-surgical cancer patients. According to ESPEN, the criteria for those in need of additional nutritional support are high-risk surgical patients with one of the following criteria, namely albumin <3.0 g/dl, BMI <18.5 kg/m², weight loss >10-15% over 6 months, Subjective Global Assessment (SGA) grade C or Nutrition Risk

Most of the hospitals in Indonesia provide the mentioned nutrition support through enteral food that is made of real food (homemade/non-industrial) for surgical patients. This kind of enteral nutrition has several weaknesses including the lack of standardization, fragility, and impracticality. The commercial enteral products are also used but these products are expensive. Local food as a functional food that contains several bioactive substances can potentially be used for enteral nutrition formulation. The formula of this nutritional support was developed using local foodstuffs from Indonesia, such as arrowroot (*Marantha arundinacea*), cork fish (*Channa striata*), local soybean tempeh, and pumpkin (*Cucurbita moschata*). The research development and patient trials have been carried out in previous studies. The results showed that this product is safe for consumption by patients(3,4). This product contains high protein, antioxidants, and good receptivity. The nutritional content of the product in one serving/sachet (40 grams) is 160.5 kcal, 8 grams of protein 4.5 grams of fat, 22 grams of carbohydrates, food fiber 2.3 grams, vitamin C 154.7 mg, calcium (Ca) 48.5 mg, iron (Fe) 1.13 mg, Zinc (Zn) 0.26 mg and antioxidants 12.8 mg/ml (3). The consumption of this product can increase protein intake, accelerate the wound healing process and reduce the rate of postoperative infectious complications(2). This

study aimed to determine the effect of providing local food-based nutritional support in adenocarcinoma rectosigmoid pre-operative patient with Nutrition Care Process (NCP) steps.

CASE REPORT

Assessment

Client History

A 54-year-old male patient diagnosed with adenocarcinoma rectosigmoid since two years ago and scheduled to have surgery with laparotomy miles procedure and an appendectomy due to bloody bowel movements. The patient also had a diagnosis of anemia and hypoalbuminemia. Since last year, the patient's weight has decreased up to 20 kg.

Food History

This patient had a regular dietary frequency but the portion was small and less than 80% of the required energy and protein (according to the recommended dietary allowance or RDA).

Anthropometric data

The actual weight of patient was 43.6 kg and 160 cm in height. This patient was undernourished with a BMI of 17 kg/m², MUAC 21.5 cm, and had 32.9% weight loss within one year. Furthermore, the patient was diagnosed with severe malnutrition based on GLIM criteria because the BMI was below 18.5 kg/m² with a weight loss above 20% beyond 6 months (5).

Biochemical Data

Albumin and leukocyte levels were normal (3.61 g/dl and 8.18 10³/μL, respectively). Total Lymphocyte Count (TLC) and hemoglobin were low with 1496 cells/mm³ and 10.3 g/dl respectively. Meanwhile, the neutrophil level is high (73%).

Nutrition Focus Physical Findings

Hand grip strength (HGS) was measured at the time of admission and the value was 7.43 kg. This patient also experienced a decrease in muscle mass and fat mass in several sites of examination.

Estimated requirement

We calculate energy requirements using the Harris-Benedict formula:

$$REE = (66.5 + (13.75 \times 43.6 \text{ kg}) + (5.003 \times 160 \text{ cm}) - (6.775 \times 54 \text{ years}))$$

$$TEE = 1101 \text{ kcal} \times 1.2 \times (1.2 - 1.4) \\ = 1585 - 1849 \text{ kcal}$$

$$\text{Protein} = 1.2 - 1.5 \text{ g/kg/d} \\ = 52.3 - 65.4 \text{ g/kg/d}$$

Diagnosis

NC-4.1.2 Condition related malnutrition related to rectosigmoid cancer as evidence by weight loss above 20% beyond 6 months, BMI <18.5 kg/m², MUAC 21.5

cm, decrease in muscle mass and fat storage. NI-5.1 Increased nutrients needs (energy and protein) related to the perioperative period as evidenced by malnutrition, BMI <18.5 kg/m², albumin 2.53 g/dl.

Intervention

The objective of a diet was to enhance the nutritional status of the patient during pre-surgery to prevent post-operative complications. The preoperative nutritional requirements of this patient are 1744 kcal, 57 gram of protein, 52 gram of fat, 261 gram of carbohydrates and 90 mg of vitamin C. The Mifflin formula was used to calculate the nutritional requirements with the consideration of the activity factor (bed rest) and stress factors due to cancer. These nutritional requirements were fulfilled from hospital diet orally. The nutritional interventions were given with the administration of nutritional support during the preoperative period 2x/day at 40 grams with the local-food-based product. The local-food based product can meet 18% energy, 28% protein, 17% fat, 17% carbohydrates, and 114% vitamin C of the total patient requirements during the preoperative period.

Monitoring and Evaluation

The preoperative period of this patient was three days. This patient underwent a postoperative period for seven days and after that was discharged. The anthropometry, biochemistry, intake, and postoperative complications were used to monitor the patient's condition during the perioperative period (Table I).

Postoperative complications monitoring was carried out for seven days. Physical examination during the postoperative period showed that there were no signs of catheter infection, wound infection, wound dehiscence, heart failure, septic shock, and respiratory failure. Also, the biochemical parameters, the neutrophil level decreased postoperatively and the TLC level continued to increase. The signs indicate that there is no inflammation after surgery. Therefore, finally, patients with no postoperative complications after seven days were discharged with an improved condition.

DISCUSSION

Malnourished preoperative cancer patients, especially those undergoing gastrointestinal (GI) surgery, need additional nutritional support during the perioperative period because they are at risk of postoperative complications (2). In this case, the patient was malnourished and was categorized as severe malnutrition according to GLIM, phenotypic criterion (weight loss > 10% for 6 months, BMI <18.5 kg/m²), as well as etiologic criteria (decreased of food intake and inflammatory conditions or tumors) (5). Nutritional support with local-food formula was given to this patient because it provides high protein content from the cork fish which accelerates the healing process and reduce

Table 1: Perioperative Monitoring and Evaluation

| Indicator | Cut-off | Pre Operation | Post Operation I* | Post Operation II** | Post Operation III*** |
|--|---------|---------------|-------------------|---------------------|-----------------------|
| Mid-Upper Arm Circumference (MUAC) (cm) | >23.5 | 21.5 | 21.5 | 21.5 | 21.5 |
| Albumin level (g/dl) | 3.50 | 3.61 | 2.53 | 2.7 | 2.7 |
| Hemoglobin (g/dl) | 12-15 | 10.2 | 8.7 | 10.2 | 10.4 |
| Total Lymphocyte Count (TLC) (cell/mm ³) | >1500 | 1671 | 680 | 817 | 1328 |
| Neutrophil (%) | 50-70 | 67.7 | 79.9 | 85.1 | 75 |
| neutrophil-lymphocyte ratio (NLR) | 1-5 | 4 | 5.7 | 8.2 | 4.57 |
| Hand Grip Strength (HGS) (kg) | >26 | 7.53 | 7.53 | 10.1 | 10.1 |
| Average energy intake (kcal) | 1744 | 1775 (101%) | 703.75 (40.3%) | 1227 (70.4%) | 1686 (96.7%) |
| Average protein intake (gram) | 57 | 54.5 (95.6%) | 19.5 (34.2%) | 50 (87.7%) | 57.7 (101%) |

Post operation I*: Day 2 post operation

Post operation II**: Day 4 post operation

Post operation III***: Day 6 post operation

the risk of postoperative complications(3). In addition, the levels of antioxidants and vitamin C in this product are also high from the content of pumpkin, therefore making it possible to speed up the postoperative wound healing process (2,3).

The monitoring step of the patient's nutritional status during the perioperative period showed an increase in HGS and MUAC measurements. Handgrip strength increases due to additional support of high protein food given during the preoperative period. In conclusion, the nutritional support given to patients during the preoperative period is capable to improve the nutritional status at the post-operative period (2).

Protein intake from this product has the effect of improving albumin levels in patients. There is a decrease in postoperative albumin levels due to blood loss during surgery. However, there was an increase, indicating an effect of improving nutritional status even though it had not reached the cut-off point. Meanwhile, the role of antioxidants and vitamin C in this nutritional support affects the inflammatory activity that occurs in the patient's body. This can be seen from the TLC levels that increased during the preoperative period or when the product was administered to the patient. Neutrophil levels also decreased during the preoperative period. However, when the operation process is carried out, the TLC level decreases again, and the neutrophils rise due to increased inflammation during the surgery process. At the postoperative phase, the inflammatory activity was determined from the value of the neutrophil-lymphocyte ratio, which indicates an increase in stress levels, and neutrophil value. After a few days, NLR and neutrophil levels decreased, while TLC increased. This means that the patient's condition was getting better during the postoperative phase (2–4).

Nutritional support with local-food based formula can help patient meets their nutritional needs. The fulfillment can reach nearly 100% for energy and protein. The patient's improved condition and the absence of signs complications indicate that providing nutritional support during the preoperational period has a good impact on postoperative conditions (2). Furthermore, the high protein and antioxidant content, as well as vitamin C

from the products, help improve the patient's nutritional status during the perioperative period (3).

CONCLUSION

In conclusions, it is important to provide additional nutritional support during the preoperative period to patients at risk of malnutrition or those already are already experiencing this deficiency. The provision of high protein, high antioxidants and vitamin C products helps to enhance the nutritional status of patients and prevent post-operative complications.

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