PRACTICUM GUIDANCE

DIETETICS OF INFECTIOUS DISEASES AND MALNUTRITION

Teaching Team:

Farapti, dr., M.Gizi
Stefania Widya Setyaningrum, S.Gz., MPH Qonita Rachmah, S.Gz., M.Sc(Nutr&Diet)

Assistants:
Aliffah Nurria Nastiti
Asri Meidyah Agsutin

Undergraduate of Nutrition Program
Nutrition Department
Faculty of Public Health
Universitas Airlangga

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PRACTICUM GUIDELINE
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DIETETICS OF INFECTIOUS DISEASES AND MALNUTRITION

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Approved by,
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Coordinator of Infectious Disease and Malnutrition Dietetics Subject

Lailatul Muniroh, S.KM., M.Kes.
NIP 1980 05 25 2005 01 2 004

Qonita Rachmah, S.Gz., M.Sc. (Nutr & Diet)
NIP 199102152018083201

INTRODUCTION

Nutritional care is an intervention or treatment in the form of patient food arrangements to help heal the patient or to improve the patient's nutritional status, which goes through several processes. The process is named Nutritional Care Process. NCP is a process in an effort to solve nutritional problems using a scientific approach, a systematic method **Nutritional Care** for solving nutritional problems, besides that it also helps dieticians scientifically and holistically manage Nutrition Care, in purpose to achieve optimal health and nutritional status for patients, and guarantee nutrition care services in improving overall health services. In other words NCP is the main guide for a dietitian to facilitate the achievement of the expected results of nutrition care. Nutrition care is provided by nutrition workers. Based on Minister of Health Regulation Number 26 of 2013, nutrition workers are Nutritionists/Registered Dietitians/Technical Dietitians. In carrying out the Standardized Nutrition Care Process the nutritionist has the functions of carrying out nutritional assessments, determining nutrition diagnoses, providing nutritional interventions, monitoring and evaluating nutrition. To carry out these functions, nutritionists need to have the competence of each of these functions.

Infectious diseases, also referred to as infectious diseases, communicable diseases and transmissible diseases, are diseases caused by pathogenic microbes. Infectious diseases result from the infection, presence and growth of pathogenic biologic agents in individual host organisms. In certain instances, infectious diseases can last around the clock. Infectious pathogens include viruses, bacteria, fungi, protozoa, multi-cellular parasites and aberrant proteins known as prions. These pathogens are the cause of disease epidemics, in the sense that without pathogens, no infectious epidemics occur. Infectious diseases that are highly infective are sometimes called contagious and can be easily transmitted through contact with a sick person. Special dietary care needs to be taken in patients with infectious diseases to promote healing and prevent deterioration of nutritional status.

In this course, students will conduct a series of tutorial processes (problem based learning) from the case studies that have been given in each theme. Students must conduct various literature searches and critical thinking

Based on the case, the students will develop an integrated nutrition care process (Nutrition Care Process). Each student will be accompanied by one tutor and students are required to present after completing the case study.

NUTRITION CARE PROCESS IN CRITICAL ILL PATIENTS

Stefania Widya Setyaningtyas

A. Learning objectives:

1. Students are able to understand, select, measure, and analyze indicators of nutritional status assessment for critical ill patients
2. Students are able to compile the right nutritional diagnosis for critical ill patients
3. Students are able to formulate and provide appropriate nutritional interventions for critical ill patients
4. Students are able to plan and carry out monitoring and evaluation of intervention results

B. Introduction

Critical Illness is a life-threatening multisystem disorder that can result in significant morbidity or mortality. In most patients, critical illness is preceded by episodes of physiological deterioration, such as increased or decreased blood pressure, heart rate, respiratory rate, body temperature, and decreased consciousness (Robertsons and Al-Haddad, 2013). Patients with critical illness will usually be given treatment in a special room called the Intensive Care Unit (ICU). Patients with organ failure, severe infection, trauma, or tissue injury are the causes of patients experiencing critical illness (Berger, 2018).

Impaired energy and nutrient metabolism is one of the important manifestations often found in critical illness. Often, the patient will experience an intense inflammatory response, which will cause the patient to experience disturbances of temperature regulation and energy expenditure. This will encourage the patient's body to change the pattern of energy metabolism in the body, which will cause massive protein breakdown muscle wasting (Berger, 2018).

Broadly speaking, the critical illness phase can be divided into two stages, vizebb phase andflow phase (Curthberson, 1942). Ebb phase is the first phase of critical illness characterized by hemodynamic instability. In this phase, hormonal changes occured and cause insulin resistance. This is an implication of the body's self-defense mechanism to conserve energy by prioritizing the use of energy for vital tissues. In the second phase, ie flow phase, will begin to perform protein breakdown as a mechanism ”flight or fight” to reduce bleeding or fight infection. In this phase, the body is in a state of catabolism. The third phase is the anabolic recovery phase (anabolic recovery), where in this phase the body carries out tissue resynthesis so that the body is in an anabolic state (Lambel et al., 2020)

Initially, nutritional therapy in critically ill patients was considered as an additional treatment to provide energy supply for the body to overcome the stress response that occurs. However, now nutritional therapy has an important role in helping improve conditions in critical illness such as weakening the metabolic response to stress, preventing oxidative injury, and modulating the immune system. Provision of nutritional therapy is a proactive strategy that can accelerate the process of improving the patient's prognosis in the ICU (Tayloret al.,2016).

Nutritional management in critically ill patients is complex and dynamic (Kane and Prelack, 2019). Therefore, in this module students are expected to be able to learn how to design nutritional therapy that is appropriate for problems in critical illness based on scientific evidence.

C. Nutritional Status Assessment

a. Eating History

Assessment of food intake is one approach that can be used to determine whether a critically ill patient has adequate energy and protein intake, especially if biochemical data are not available. Examining the dietary history of critical patients is something that is challenging, because usually critical patients have limited communication skills due to loss of consciousness, weakness, or use of medical aids. Therefore, dietary history data can be obtained from family members who know the patient's daily eating habits (Kane and Prelack, 2019). Several dietary history assessment points that need to be known from patients include but are not limited to the following points (AND, 2012):

I. Past/pre-treatment dietary history (energy intake, meal and snack patterns, macro- and micronutrients, etc.)
II. Adequate nutrient intake
III. Bioactive substances (alcohol, soy protein, fiber, fish oil, etc.)
IV. Current eating history
V. Food preferences, or food restrictions due to beliefs or religion.
VI. Changes in appetite or eating habits (as an implication of the disease process or comorbid conditions)
VII. Specific nutrient requirements related to the patient's medical condition
VIII. Food allergies or intolerances.
IX. Appropriateness of previous nutrition interventions
X. Route of feeding (oral, enteral, or parenteral)
XI. Physical activity habits and limitations

In addition, keep in mind that the patient's recorded food intake not only comes from oral intake, but also from other therapies that can affect the energy value. For example, some medications such as propofol and dextrose infusions contain calories that must be included in the total food intake (Kane and Prelack, 2019).

Evaluation of food intake is useful to find out whether the patient has received appropriate food intake to support the healing process. In this process, the macronutrients that are emphasized in the evaluation are energy and protein. In addition, the additional evaluation of micronutrient intake will also add benefits. However, specific micronutrient requirements during critical illness have not been established and likely differ between diagnoses. Therefore, it is important to ensure that all patients receive at least the Reference Dietary Intake (DRI) for all essential micronutrients (Kane and Prelack, 2019)

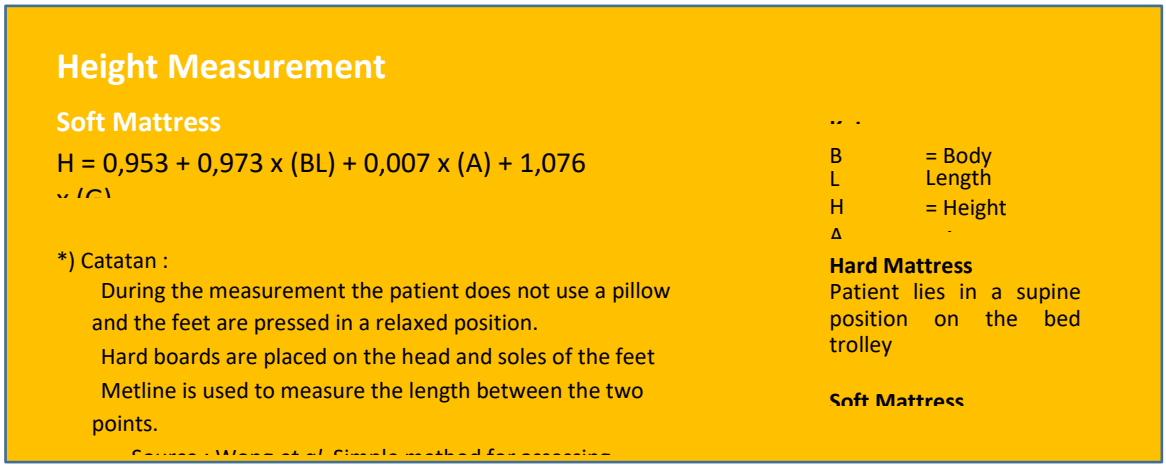
b. Anthropometry

Weight changes are difficult to evaluate in patients in the ICU because of the fluid therapy patient receives, plus the rapid breakdown of tissue. Therefore, nutritional status as assessed by measuring Body Mass Index is not an accurate indicator of malnutrition in some patients critically ill patients (Singer et al.,2019), especially in patients on aggressive fluid resuscitation therapy (Kane and Prelack, 2019).

Anthropometric characteristics which are important points that need to be seen in critical patients are loss of muscle mass and sarcopenia (Singeret al.,2019). Several nutritional screening tools can be used to diagnose malnutrition in critically ill patients, including Nutritional Risk Screening (NRS 2002), Nutritional Risk in Critically Ill (NUTRIC) (Tayloret al.,2016), and GLIM Criteria (Singeret al.,2019).

Anthropometric measurements on critically ill patients The aim is to identify the patient's nutritional needs. However, patients in critical condition usually cannot measure their weight or height directly due to muscle weakness, decreased consciousness, or the use of medical aids such as ventilators. On the other hand, height and weight estimates may not be accurate. Therefore, anthropometric measurements in order to determine the patient's nutritional needs can be carried out by using a weight scale at the patient's bed (bed scale) and body length measurements (recumbent length) (Box 1), although it should also be realized that this method can cause measurement errors. Repeated measurements can improve accuracy and minimize measurement errors (Kane and Prelack, 2019).

In patients undergoing aggressive resuscitation therapy or experiencing edema, body weight should be calculated using dry weight. Body weight can also be estimated based on usual body weight whose data can be collected from knowledgeable family members (Kane and Prelack, 2019). In some cases where not available bed scale, then estimates of energy requirements can be calculated using ideal body weight in patients with normal nutritional status. In the case of patients with obesity, ESPEN recommends that energy calculations be calculated based on ideal body weight at BMI = 25 kg/m2 based on the patient's height (Singeret al., 2019).



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c. Biochemistry

The need for evaluation of biochemical data in patientscritical ill varies, depending on critical care diagnoses, and may change during the period of hospitalization. Monitoring of glucose, electrolytes, acid-base balance, and liver and kidney function is often necessary (Kane and Prelack, 2019).

In critical care, traditional serum protein markers (albumin, prealbumin, transferrin,retinol binding protein) is a reflection of the acute phase response (increased vascular permeability and reprioritization of hepatic protein synthesis) and does not accurately represent nutritional status in critical conditions (Tayloret al.,2016). Inflammation is usually associated with increased C-reactive protein (CRP) and hypoalbuminemia. Isolated albumin and pre-albumin levels are not a marker of good nutritional status, low values are the result of a response to inflammation (negative acute phase protein) (Singeret al.,2019).

In some situations, assessment of protein status using a urine urea nitrogen (UUN) indicator may be advantageous. A negative nitrogen balance indicates that protein intake may be insufficient or insufficient for metabolism. The recommended nitrogen balance target is between -2 and +2 grams per day. However, the UUN examination is inaccurate when performed in patients with kidney failure or bleeding (Kane and Prelack, 2019).

d. Fisik Klinis

Clinical physical examination related to nutrition for critically ill patients aims to strengthen the diagnosis of impaired nutritional status or malnutrition. The results of this clinical physical examination cannot stand alone, but need to be used with other indicators to identify the presence of malnutrition or changes in nutritional status. Several nutritional clinical physical assessment indicators that are recommended to be measured include (AND, 2012; Kane and Prelack, 2019):

i. Overall appearance
ii. Skin (open wounds, decubitus ulcers, signs of micronutrient deficiency)
iii. Signs or symptoms of malnutrition or obesity
iv. Wasting of muscle and fat tissue.
v. Intake and Output, for example feces, fistulas, or draining wounds
vi. Fluid status (edema, ascites, dehydration)

vii. Gastrointestinal conditions
viii. Previous feeding route
ix. Functional ability
x. vital signs

In addition to strengthening the data in establishing nutritional status, clinical physical examination is also important to assess the patient's readiness to receive food via the oral or enteral routes. One indicator of examining digestive function is by measuringGastric Residual Volume (GRV). The following is an assessment of gastrointestinal function using the GRV (Lee and Daren, 2018):

Table 14 Tanda Disfungsi Gastrointestinal

Gastrointestinal Symptoms	Definition
high GRV	GRV maximum >500 mL at least 1 time
Vomiting	Visible vomiting of any amount
Diarrhea	Liquid stools 3 times or more in 1 day
Bowel distension	Suspected or confirmed bowel dilatation on siteanywhere from the intestine
Gastrointestinal bleeding	Appearance of blood in vomit, nasogastric aspiration,or faeces
Intra-abdominal hypertension	Mean intra-abdominal pressure per day ≥12 mmHg
Abdominal Compartment Syndrome	Mean intra-abdominal pressure 20 mm Hg with recent organ dysfunction, with intra-abdominal pressure measurement in supine position with zero point on mid axillary line with a maximum instillation volume of 25 mL

GRV, gastric residual volume. Adaptasi dari : Reintam Blaser A, Poeze M, Malbrain ML, Bjorck M, Oudemans-van Straaten HM, Starkopf
J. Gastrointestinal symptoms during the first week of intensive care are associated with poor outcome: a prospective multicentre study. *Intensive Care Med*. 2013;39(5):899-909. https://doi.org/10.1007/s00134-013-2831-1.34; Whelan K, Judd PA, Preedy VR, Taylor MA. Covert assessment of concurrent and construct validity of a chart to characterize fecal output and diarrhea in patients receiving enteral nutrition. *JPEN J Parenter Enteral Nutr*. 2008;32(2):160-168. https://doi.org/10.1177/0148607108314769

e. Patient History

Providing nutritional therapy to critical patients requires careful consideration. One of the things that a nutritionist needs to know before developing a diet plan is to know the overall condition of the patient. This is important so that the nutritional diagnosis given is in accordance with the patient's condition and comorbidities. Some indicators of patient history that need to be explored are as follows (AND, 2012):

i. Patient and family medical history, as well as a history of comorbidities
ii. Nutrition related medical complications
iii. Surgical action
iv. The effect of disease on the ability to eat, digestion, metabolism, and the absorption and use of nutrients.
v. Disease management
vi. Factors that may be related to potential access to nutrition therapy

D. Nutrition Diagnosis

Critical illness patients usually experience nutritional problems, either due to their illness or because of their limited ability to eat and drink. Some nutritional diagnoses that often appear in critically ill patient are (Krause, 2019):

- Lack of oral intake (requires intake of nutrients or fluids from other routes)
- Inadequate or excess intake of enteral or parenteral
- Improper enteral or intravenous route of administration
- Lack or excess fluid intake
- Increased need for specific nutrients
- Excess carbohydrate intake (eg from intravenous dextrose-containing or parenteral formulas, especially in malnourished or at-risk patients)refeeding syndrome)
- Disorders of laboratory values related to nutrition
- Gastrointestinal dysfunction (eg vomiting, diarrhea, constipation, ileus)

E. Nutrition Intervention

a. Purpose of Nutrition Therapy

Nutritional interventions in patientscritical ill has the main goal to improve the patient's prognosis by providing food intake according to the needs and abilities of the patient. In addition, the fulfillment of adequate nutrition is also important to minimize protein catabolism that occurs in critical conditions and prevent loss of muscle mass. To achieve the objectives of the intervention, several strategies can be used, including:

- Provide nutritional intake as early as possible if the patient's condition allows and it is safe to receive nutritional therapy
- Avoid overfeeding, by feeding less than needed
- Provide immunonutrients if possible.

b. Energy Requirement

Determining energy needs for critically ill patients is not an easy thing. Both S.C.C.M/ASPEN and ESPEN recommend using indirect calorimetry to identify energy requirements in critically ill patients (Tayloret al.,2016; Singer et al.,2019). However, not all treatment locations have facilities for indirect calorimetry, especially in developing countries like Indonesia. Therefore, onsetting are limited, several alternative calculations to predict energy needs can be used as follows.

Table 15 Energy Requirement Prediction Formula in Critical Patients

Conditions	Calculations	Reference
Non obese, with a ventilator	PSU 2003b RMR = Mifflin (0,96) + VE (31) + Tmax (167) – 6,212	Academy EAL
Obese, on ventilator, <60 years	PSU 2003b RMR = Mifflin (0,96) + VE (31) + Tmax (167) – 6,212	Academy, EAL
Obese, on ventilator, ≥60 years	PSU 2010 RMR = Mifflin (0,71) + VE (64) + Tmax (85) – 3,085	Academy EAL
Obes 30-50 kg/m2 Obes >50 kg/m2	11 - 14 kcal/kg Actual Weight 22 – 25 kcal/kg Actual Weight	ASPEN/SCCM
All condition	REE = VCO2 x 8.19	ESPEN
	20-25 Kcal/kg Body Weight/day	ESPEN

Notes : PSU = Penn State University
RMR = Resting Metabolic
Rate Mifflin = Miflin-St Jeor
Equation
RMR men = 10 x Weight (kg) + 6,25 x Height (cm) – 5 x Age (year) +5
RMR women = 10 x Weight (kg) + 6,25 x Height (cm) – 5 x Age
(year) – 161 VE = ventilation minutes (L/minutes)
Tmax = Maximum Temperature (°C)

ESPEN stated that the prediction of energy needs uses an inaccurate formula (up to 60%). Furthermore, this prediction becomes farther from the actual needs when applied to patients with extreme nutritional status, for example undernutrition or overnutrition. Therefore, when the patient's energy needs are determined based on a calculation formula, energy administration should use the hypocaloric principle (no more than 70% of needs), especially in the initial phase of feeding. However, if energy requirements are determined by indirect calorimetry, then isocaloric feeding is preferred (Singetet al.,2019).

The inaccuracy of formulas for predicting energy requirements in critically ill patients can be caused by several factors, such as body weight, medication, and body temperature. Using a simpler formula (25-30 kcal/kg BW) does not produce a more accurate value, but it is easier to do. An important consideration when using any energy requirement prediction formula is body weight. In patients receiving aggressive resuscitation therapy, or those with edema, the energy calculation must use dry body weight or normal body weight(usual body weight) (Taylor et al.,2016).

c. Protein Needs

Adequate protein intake is very important for ICU Patients. Protein is useful for facilitating the wound healing process, building immune function, and maintaining fat-free tissue mass. Determination of protein requirements in critically ill patients is usually based on nutritional status and body weight. Several equations for protein requirements for critical conditions can be seen in the following table:

Table 16 Formulas for Estimating Protein Needs in Critical Patients

Conditions	Protein Needs	Reference
Not obese (IMT<30 kg/m2)	1-2 – 2 g/kg BW	SCCM/ASPEN
non obese	1.3 g/kg BW	ESPEN
obesity **IMT 30 – 40 kg/m2** **IMT >40 kg/m2**	 2 g/kg Ideal BW Up to 2.5 g/kg of ideal body weight	SCCM/ASPEN
Acute Renal Failure	1.2 – 2 g/kg BW	SCCM/ASPEN
Hemodialysis or continous renal replacement therapy	Up to 2.5 g/kg of body weight	SCCM/ASPEN
Burns	1.5 – 2 g/kg BW	SCCM/ASPEN
Patients with stress (including burns)	20% - 25% total energy	Academy, EAL

In both non-obese and obese patients, giving a high-protein diet is still recommended, even though energy is given hypo calorically (Tayloret al.,2016; AND, 2018). A cohort study found that administration of a high-protein formula (1.3 g/kg) was associated with reduced mortality at 28 days. This is not found in patients who get energy as needed with a protein intake of 0.8 g/kg (Weijset al.,2012).

d. Micronutrient Requirements

Provision of micronutrients as needed produces positive benefits for the healing of critically ill patients. Accelerated wound healing, increased cellular immunity, and suppressed oxidative stress are some of the benefits of adequate micronutrient intake. Fulfillment benefits

Micronutrients are especially important for some conditions, such as trauma, burns or impaired wound healing (Fadeuret al.,2020). Some situations that require micronutrient supplementation are as follows..

Table 17 Some Clinical Situations Requiring Supplementation

Clinical Situation	Micronutrient Supplementation
Suboptimal diet Energy intake <1500 Kcal/day	Multivitamins/mutliminerals, vitamin D, calcium, vitamin B12, magnesium
Long hospital stay	Vitamin D, Calcium
Old wound healing, polytrauma	Multivitamin, multimineral
Treatment with Proton Pump Inhibitors (PPIs) long-term	Vitamin B12, magnesium, calcium
Acute renal failure, CRRT	Multivitamin/Multimineral
Chronic kidney failure	Vitamin D, Vitamin K
Post bariatric surgery	Multivitamin/multimineral, vitamin D, calcium, vitamin B12, iron
Alcohol user	B vitamins, fat soluble vitamins, zinc
Liver disease (eg fatty liver)	Zinc, selenium, vitamins A, D, K, and B12

Sumber : Fadeur, M., Preiser, J-C., Verbrugge, A-M., Misset, B., Rosseau, A. F. Oral Nutrition during and after Critical Illness: SPICES for Quality of Care! *Nutrients* 2020 12, 3509; doi:10.3390/nu12113509

Unfortunately, in critically ill patients, the need for micronutrients may not be met through oral intake alone, due to decreased ability to eat or increased needs (Manson and Bassuk, 2018). In addition, the need for specific micronutrients for critical illness conditions is still being debated (Fadeuret al.,2020). At a minimum, critical patients need to meet micronutrient needs according to the Nutrition Adequacy Rate (AND, 2020).

e. Algorithm for Providing Nutrition Therapy in Critical Patients

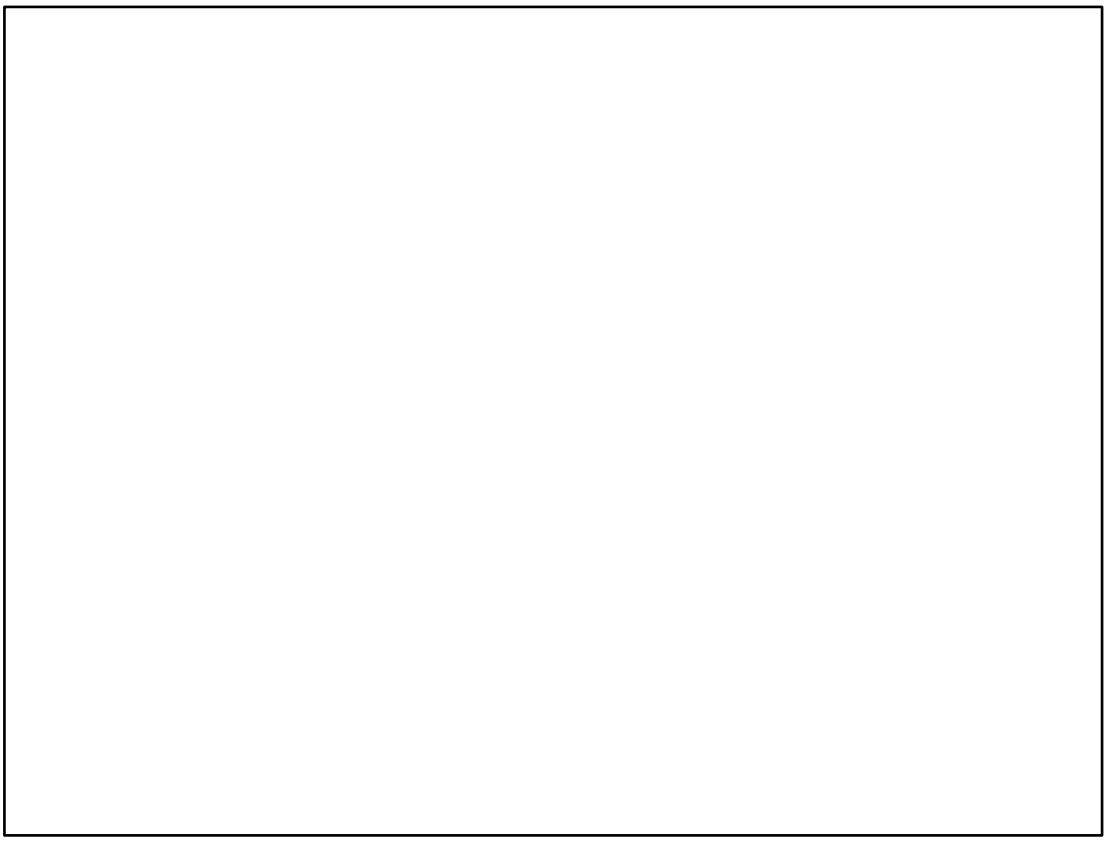

Figure 1 Algorithm for Providing Nutrition Therapy in Critical Patients

Source : adapted from Zanten, Waele, dan Wischmeyer. Nutrition therapy and critical illness: practical guidance for the ICU, post-ICU, and long-term convalescence phases. BMC *(2019) 23:368. https://doi.org/10.1186/s13054-019-2657-5*

Erly enteral feeding is recommended by ESPEN compared to initial parenteral administration (Singer*et al.,*2018). Although feeding in shock is still being debated, the provision of enteral therapy in the early phase after hemodynamic stabilization is highly recommended (Zanten, Waele, and Wischmeyer, 2019).

Figure 1 shows the algorithm for administering nutritional therapy to critically ill patients at various phases. Gradual increase in feeding is recommended to prevent overfeeding (*overfeeding*). In addition, even though metabolically there is massive energy production in critical illness, this cannot be eliminated by nutritional therapy (Frapoint and Preiser, 2013). Overfeeding in the early phase should be avoided. Normocaloric or hypocaloric energy provision does not produce different outcomes as long as the protein intake is given the same. Furthermore, giving excessive aggressive caloric intake at the beginning is more at risk of causing hyperglycemia and increasing the need for high-dose insulin therapy. A caloric deficit of up to 20-30% can be tolerated in the early weeks of ICU stay. However, a calorie deficit over a longer period of time needs to be avoided (Zanten, Waele, and Wischmeyer, 2019).

One of the goals of providing nutritional therapy in critical patients is to prevent it from happening*Refeeding Syndrome* (RFS). RFS usually occurs in response to administration of nutrients after a period of starvation or starvation. Usually, RFS is characterized by changes in electrolytes, ie by the presence of hypophosphatemia. A caloric deficit of up to 500 kcal/day or less than 50% of the target for 2 to 3 days can prevent death from RFS (Olthof*et al.,*2018).

After the critical period has passed, physiological regulation is restored, and food intake will increase over time. Various kinds of functional changes can inhibit nutritional intake during the recovery period. Patients who only received intake by the oral route had a lower intake (40%). After removal of the enteral tube, usually energy and protein intake will decrease to 22 and 27% of the target. This indicates that the use of an enteral tube during insufficient oral intake should be considered (Zanten, Waele, and Wischmeyer, 2019).

Oral intake should be given as quickly as possible. However, before changing the diet, it is necessary to evaluate the patient's ability to eat, for example swallowing ability and risk of aspiration. Enteral feeding should also not be stopped until the patient's appetite improves and can consume food to meet at least 66-75% of energy requirements through the oral route (AND, 2020)

After the patient is discharged from the hospital, the nutritionist needs to consider whether the patient is able to meet energy and protein requirements through oral intake. In patients who experience loss of energy and muscle mass during treatment in the ICU, it is necessary to increase energy and protein intake to restore this condition. Providing a high-energy and protein diet can take place monthly, even yearly. This is necessary to prevent worsening of the prognosis and improve the patient's quality of life (Zanten, Waele, and Wischmeyer, 2019).

f. Enteral Formula

Enteral feeding is a prioritized strategy to meet the nutritional needs of critically ill patients. The Academy of Nutrition and Dietetics recommends meeting more than 60% of energy intake should be achieved within the first week of intensive care. Providing formula beyond the patient's digestive ability is known to be detrimental (AND, 2012). If the patient is malnourished or at high risk of malnutrition, ASPEN recommends increasing enteral formula feeding to >80% coverage in 48-72 hours (Tayloret al., 2016). ESPEN recommends increasing the energy intake of enteral formulas to 70-100% within 48 hours (Singeret al.,2019). For obese people, the target intake ranges from 65-70% of the requirement as measured by IC (Tayloret al., 2016). Several types of enteral formulas that are recommended for various problems in critical patients are as follows (Critical Care Clinical Practice Guidelines Committee, 2015; AND, 2012; Tayloret al.,2016; Singer et al.,2019).

Table 18 Types of Enteral Formulas and Recommendations for Their Administration

Enteral Formula Component (EF)	CCCPGC	EAL	ASPEN/SCCM	ESPEN
formula type	Whole (polymeric) proteins are necessary considered	-	Polymeric standard formula	-
FE with arginine supplementation	Not recommended	Use with careful evaluation	May be considered for patients with traumatic *brain injury* (TBI) and SICU perioperative Use caution in septic patients	-
FE with supplementation of fish oil, boran seed oil, and antioxidants	Recommended for patients with ARDS, ALI, and sepsis	Considered with ARDS and acute lung injury	Considered for TBI and SICU perioperative; not recommended for severe ARDS and pulmonary, or deep, injuries care in the ICU	Consider ALI or ARDS

Enteral Formula Component (EF)	CCCPGC	EAL	ASPEN/SCCM	ESPEN
Enteral glutamine	Recommended for burn patients; Do not use in shock or multiple failure patients organ	Not recommended, except for burns	Not recommended; recommended for TBI and SICU; not recommended in MICU	Recommended for patients with burns, trauma and complex wound healing.
Fiber	Routine use is not recommended	Can use soluble fiber, except in conditions of hemodynamic instability, severe dysmolity, and positive clostridium *difficile*. Soluble fiber is recommended to prevent or treat diarrhea	Soluble fiber is recommended for stable patients with diarrhea. Avoid water-soluble fiber if there is a risk of intestinal ischemia or severe dysmotility	-
GRV	GRV 500 ml vs 250 ml is not associated with increased gastrointestinal complications, but is associated with better acceptance of the formula Not checking GRV vs GRV>250 mL associated with the provision of energy intake better.	EN should not be delayed if the GRV is <500 mL in the absence of other clinical signs of intolerance	GRV monitoring is not part of the routine care of ICU patients receiving FE. If monitored, ensure EN is not delayed if GRV <500 mL in conditions where there are no other clinical symptoms of intolerance	-

*Notes: FE = Formula Enteral; ARDS = Acute Respiratory Distress Syndrome; ALI = Acute Lung Injury; TBI = Traumatic Brain Injury; SICU = Surgical Intensive Care Unit; MICU = Medical Intensive Care Unit; GRV = Gastric Residual Volume.

Enteral formula feeding as early as possible (within 24 to 48 hours after admission) is beneficial for suppressing the stress response and reducing muscle atrophy due to catabolic processes produced by metabolic responses. Examination of bowel sounds and/or flatus does not need to be a benchmark for starting enteral formula administration (Tayloret al.,2016; Singer et al.,2019)

In the initial phase of enteral formula administration, formulas in the amount of 10 mL and 40 mL per hour can be given (AND, 2020). The amount of formula may be increased by 10 to 20 mL every 8 to 12 hours in the first 48 to 72 hours of treatment until energy targets are reached (Tayloret al.,2016; Singer et al.,2019). Most hemodynamically stable patients can tolerate rapid changes in enteral formula (AND, 2020).

Gastric access is one of the most frequently chosen accesses and is quite adequate as an entry route for enteral formula. However, if the stomach is not functioning properly, or in patients at high risk (eg, severe torso or abdominal injuries, severe head injuries, burns, intra-abdominal surgery, aspiration, and persistent GRV >500 mL), then the small intestinal route is preferred (AND, 2020). Gastric access is recommended if the airways are working properly, and this route can be changed to the jejunal or ileal route when the patient is at high risk of aspiration or feeding intolerance (Tayloret al.,2016; Singer et al.,2019).

There are no data showing the optimal formula that can be given to critical patients The Academy of Nutrition and Dietetics recommends feeding a high-protein; low-fat formula with a fat type at least 25% MCT (*medium chain triglycerides*); and high in vitamins and minerals. Providing formulas that contain

immunonutrients can be an option because they are useful for reducing the risk of infection and complications, length of stay, and mortality (AND, 2020). The ESPEN guidelines state that enteral administration of formulas containing fish oil or boranse oil and antioxidants may be associated with reduced length of stay and length of ventilator use, as well as decreased mortality in patients with acute lung injury andAcute Respiratory Distress Syndrome (ARDS), serta sepsis (Singer et al.,2019).

Enteral formula certainly has indirect implications for fluid intake in critically ill patients. Fluid requirements in critically ill patients are very different from healthy people, where the need may be higher or lower than in normal conditions. Fluid requirements may also change rapidly during the course of the disease. When fluid intake is restricted, the enteral formula concentration should be increased. However, if this increase is not able to provide enough protein, then protein supplementation from other pathways is needed. If there are no fluid restrictions, then a low concentration, high protein formula can be used. Fluid restriction in enteral formulas usually occurs in patients with acute respiratory failure (Tayloret al.,2016).

F. Monitoring and Evaluation

Monitoring and evaluation will focus on the same indicators that are measured in nutritional status assessments. As with other therapies, nutritional therapy is also important to monitor regularly. Monitoring and evaluation of nutritional interventions aims to assess the intake received by patients, as well as how the patient responds to the nutritional interventions given. Some recommendations for nutritional monitoring parameters can be seen in the following table

Table 19 Parameter Monitoring Gizi Pasien Kritis

Parameter	4x/day	Daily	2x/week	Weekly
Blood glucose	V	V		
Potassium, Phosphorus, Magnesium	First day	V		
Administration of insulin (p 24 jam)		V		
Urine output		V		
Energy fulfillment and nutrition		V		deep accumulation the first week
Triglycerides			V	
Energy Expenditure			Ideal	V
Body weight		V (burn wound)	Ideal	V
Stool			V	
GRV		Every 12 hours at 3 first day		

Source : Berger, M.M (2018). Critical Care Nutrition Therapy for Non-nutritionists. Laussane : Springer International Publishing; Academy of Nutrition and Dietetic (2020). Nutritional Care Manual : Critical Illness. Available at https://www.eatrightpro.org/-/media/eatrightpro-files/coronavirus/ncm-critical- illness.pdf?la=en&hash=3E06D788102271D73C4DA5B05DC6A52B86AA8F58

Monitoring of nutritional intake from all routes, both enteral and parenteral is important to evaluate whether critical patients have received energy and nutrient intake according to the target. If energy intake is not appropriate, it is necessary to adjust the volume and speed of enteral formula.

To measure patient acceptance of nutritional therapy, several tests can be carried out, one of which is a gastrointestinal examination. Measurement of stool volume, GRV, and abdominal distention, and feeding intolerance can show whether feeding targets are being achieved. Laboratory data such as blood glucose, electrolyte status, kidney function, hydration status, acid base, and inflammatory markers need to be monitored to detect metabolic problems such asrefeeding syndrome. Regular triglyceride monitoring as well necessary in critically ill patients receiving propofol for sedation, or lipids as part of parenteral nutritional therapy. If the triglyceride level is >400 mg/dL, then lipid intake needs to be reduced or stopped (AND, 2020).

NUTRITION CARE PROCESS IN SURGICAL CASES

Farapti, Arnoveminisa Farinendya, dan Adisty Pavitasari

A. LEARNING OBJECTIVES

1. Students are able to understand, select, measure, and analyze indicators of nutritional status assessment in surgical patients
2. Students are able to compile the right nutritional diagnosis for surgical patients
3. Students are able to formulate and provide appropriate nutritional interventions for surgical patients
4. Students are able to plan and carry out monitoring and evaluation of the results of interventions in surgical patients

B. INTRODUCTION

Surgery is all treatment that uses invasive methods by opening or displaying the part of the body to be treated. Generally, surgery is performed by making an incision, and ends with closing and suturing the wound. Broadly speaking, surgery based on seriousness is divided into major surgery and minor surgery

1. Major surgery (major surgery) describes major surgery that uses general anesthesia. Included in major surgery are laparotomy, craniotomy, coronary artery bypass, colon resection. Laparotomy is usually performed in patients with a diagnosis of perforated appendicitis, inguinal hernia, stomach/intestinal/colon cancer, chronic intestinal inflation, intestinal obstruction, and peritonitis.
2. Minor surgery (small operation) is a minor operation that is usually done using local anesthesia. Examples of minor surgery are circumcision, nail extraction, benign tumor removal surgery, cataract extraction.

Surgical actions based on the urgency of carrying out the operation are divided into

1. Emergency surgery (emergency/cito) is surgery that is not planned or not scheduled beforehand, performed on patients in emergency conditions with the aim of saving lives and maintaining the function of their organs. Examples of disease diagnoses that need to be performed cito surgery are perforation of the appendix, severe bleeding, traumatic amputation,
2. Elective surgery is surgery that is planned and has been scheduled beforehand and can be postponed according to the seriousness/severity of the patient's disease keseriusan/ tingkat keparahan penyakit pasien

i. SURGICAL PROCEDURES (PRE-OP AND POST-OP) AND COMPLICATIONS

Surgery is an action performed through a medical process, is invasive and aims to diagnose; treatment of disease including preventing, eliminating, restoring; and palliative measures to reduce pain. Including preoperative activities, which are all initial preparatory actions before surgery, which includes a general physical examination, nutritional status, laboratory tests, other supporting examinations, to the psychological preparation of the patient

FASTING BEFORE SURGERY(PRE-OP)

In any conditions, patients who will undergo anesthesia and especially in elective surgery, the patient's condition should be well prepared including their nutritional status. Before undergoing surgery at the hospital, patients are advised to fast. This fasting rule varies depending on the patient's health condition, the type of surgery to be performed, and the type of anesthesia. The average patient is advised to fast for about 6-8 hours before surgery, with the consideration that this duration is considered safe enough for the various types of food and operations undertaken. The purpose of this pre-op fasting is to prevent aspiration and empty the digestive tract from happening aspiration pneumonia. The duration of fasting is still being debated and is an interesting study. Some studies show that prolonged overnight fasting has no better effect than fasting 2 hours of drinking clear liquids and 6 hours of solid food. In Indonesia, based on the Decree of the Minister of

Health of the Republic of Indonesia in 2015 concerning national guidelines for anesthesiology medical services and intensive therapy, the fasting guidelines for elective surgery depend on the age of the patient. In adults, it is recommended to fast for 6-8 hours on solid food and fast on clear liquids (clear liquid) 2 hours before surgery. This condition is certainly not absolute and must still be adjusted to the patient's condition, especially in patients with certain clinical and complications as well as the type of operation being carried out..

COMPLICATIONS AFTER SURGERY(POST OP)

Every surgery is synonymous with an incision which is traumatic for the patient and causes discomfort. Almost every surgical procedure there is always the possibility of postoperative complications. Prevention and recognition of these complications need to be recognized as early as possible to minimize risks and if complications occur, they can be treated immediately. Therefore postoperatively, a thorough evaluation including the respiratory system, circulation (check bleeding), regurgitation and vomiting, hypothermia, other physiological disturbances due to shock, including the introduction of conditions of nutritional status and other complications must be identified immediately. The types of complications that occur depend on the diagnosis of the patient's disease and the type of surgery performed. However, conditions of discomfort or complications that generally accompany surgery are:

1. Pain

Pain is the main complaint of patients after undergoing surgery. The degree of pain for a person varies depending on many things, however, this pain complaint must be addressed immediately in line with the optimal healing process. Several studies report that postoperative patients often experience severe pain despite taking analgesic drugs. Improper management of postoperative pain is very detrimental to patients because it will slow down the healing process due to impaired physiological function and stress reactions, extending the length of stay, increasing hospital costs, and also increasing a person's mobility and morbidity rates.

2. Bleeding

After pain, bleeding is one of the most common complications and often occurs after surgery. The cause of bleeding is multifactorial, it can be caused by hemostatic disorders (blood clotting disorders) or surgical factors themselves, such as blood loss during surgery. This blood loss can lead to hypovolemic episodes. Noted, complications of postpartum hemorrhage are the biggest cause of death in mothers after giving birth. Blood transfusion is often necessary for the management of patients with bleeding. Evaluating the amount of postoperative bleeding and recognizing signs of hypovolemic shock is very important to prevent and reduce postoperative morbidity and mortality.

3. Nausea and vomiting

Postoperative nausea and vomiting are generally caused by the influence or side effects of the anesthetic given. Under normal conditions, this feeling of nausea and vomiting will gradually improve. In conditions of abdominal surgery or operations related to the digestive system, complaints of nausea and vomiting are often persistent. If this condition lasts in the long term it can cause low intake and lead to malnutrition

4. Infections due to surgical wounds

Infection is a condition when microorganisms enter and develop in the host's body, causing illness accompanied by local or systemic clinical symptoms. Wounds in the body, including surgical incisions, provide opportunities for bacteria to enter, and increase the risk of infection. Infection of the operating area which is commonly called surgical site infection occurs in <30 days postoperatively (CDC 2017). Risk factors for infection due to surgical wounds include patient conditions, types of operations, surgical procedures, and post-surgical care. A history of co-morbidities and malnutrition in surgical patients can

reduce the body's immune system, thereby interfering with the wound healing process

C. NUTRITIONAL STATUS ASSESSMENT (ASSESSMENT) NUTRITION SCREENING

The Standardized Nutrition Care Process (PAGT) is a systematic approach in providing quality nutrition care services carried out by nutrition workers, through a series of organized activities. The first system prior to admission is a screening process to identify whether the patient is malnourished and requires integrated nutritional care from a nutritionist in an effort to improve the quality of nutrition care delivery. Similar to other patients who initially enter the hospital, in surgical patients, especially in elective surgery cases, the screening process can be carried out by a nutritionist or other medical staff. Many validated screening instruments are recommended for patients in hospitals who generally ask about changes in body weight, food intake, BMI nutritional status, and co-morbidities. The Espen guidelines recommend using the NRS-2002 instrument for screening surgical patients..

NUTRITION ASSESSMENT

In any conditions, patients who will undergo anesthesia and especially in elective surgery, the patient's condition should be well prepared including his nutritional status. After the screening process and determining the surgical patient has a history of malnutrition, the next step is to carry out an in-depth nutritional status assessment. This is to determine nutritional problems which will then be followed up with diagnosis, intervention and monitoring of the overall evaluation of the patient's condition. Specific questions to assess the nutritional status of surgical patients are highly dependent on the patient's disease diagnosis. Therefore nutritionists are required to have a comprehensive understanding of the pathophysiology of the disease experienced by the patient, the basic metabolic changes that occur as a result ofinjury as well as being able to assess and analyze the assessment of nutritional status as a risk factor or complication of surgery..

FOOD HISTORY

Penilaian Assessment of dietary history needs to be done before and after surgery. Pre-surgical assessment is to assess the adequacy of the patient's nutritional intake, whether it is in optimal condition at the time of surgery, so that reserves are available to deal with stress and wound healing. The principle of managing food after surgery depends on the type of surgery and the type of comorbidities. The post-surgical food intake assessment aims to analyze whether the post-surgical patient's nutritional intake is sufficient to achieve a healthy return to normal soon, speed up the healing process and increase the patient's immune system. It is necessary to assess the needs of macronutrients, especially energy and protein, and micronutrients such as iron, electrolyte and fluid imbalances, as well as other specific nutrients.

The collection of nutritional and dietary history data on surgical patients includes data on eating habits, dietary restrictions, favorite foods, presence or absence of allergies and the patient's average daily food intake. The patient's eating habits can be one of the factors that determine the incidence of disease, especially the incidence of diseases related to gastrointestinal diseases and the incidence of cancer that causes them to undergo surgery.

Fasting in conditions of metabolic stress due to the injury process is different from fasting in physiological conditions. The surgical process stimulates a condition called metabolic stress response namely the release of stress hormones and various inflammatory mediators. This aims to achieve a suitable and functional healing process. Under these conditions catabolism of glycogen, free fatty acids, and amino acids occurs in circulation. As a consequence is the loss of muscle tissue in the short term or long term needs attention. Therefore the assessment of the adequacy of energy and protein intake such as the amino acids arginine and glutamine is important for tissue repair, supports the immune system, reduces the risk of post-surgical infection.

Complications or side effects that occur after surgery such as nausea and vomiting and discomfort such as pain will cause decreased appetite and limited food intake. Assessment of the patient's food intake

history is very important, whether the patient can eat by oral, enteral, or parenteral routes. Assessment of food intake before pre-op is important to determine the patient's eating habits and the amount of certain nutrients for further nutritional interventions in post-surgical conditions. Data on consumption of medicinal and herbal supplements, knowledge/beliefs/behaviors, availability of distribution and food, physical activity and quality of life for nutrition as supporting data are necessary to complement food history data.

ANTHROPOMETRY

Anthropometric assessment is carried out by measuring weight and height to obtain a body mass index (BMI) value. In conditions where height cannot be measured, body length, knee height (TL), arm span or half arm span can be used. Other measurements such as upper arm circumference (LiLA), skinfold thickness (skinfold), head circumference, chest circumference, waist circumference and hip circumference can be done as needed.

In anthropometric data, it is necessary to explore the history of weight loss, loss of fat stores, and muscle wasting. Malnutrition conditions are prone to occur in patients treated in hospitals. Low BMI data is almost always associated with malnutrition. In contrast, obesity, which is often associated with excess macronutrients, is reported to be around 15-20% also experiencing nutritional deficiencies such as micronutrients in their bodies, since obesity is categorized as chronic malnutrition with inflammation. Weight loss of >10% or >5% over the last 3 months should be recorded as an important finding for immediate nutritional intervention.

In surgical patients, especially in elderly patients, the incidence of sarcopenia should receive attention. Sarcopenia (loss of muscle mass) is important to consider the prognosis of the surgery performed and disease processes that can affect nutritional status. Sarcopenia is usually associated with both undernourished and overnourished geriatric populations, where there is a decrease in functional and hormonal imbalances. ESPEN defines the criteria for malnutrition as BMI <18.5 kg/m2 or a combination of >10% or >5% weight loss over 3 months and decreased BMI or decreased fat-free mass index (FFMI).

BIOCHEMISTRY

Surgery is basically a trauma that will cause physiological changes in the body in response to trauma. The surgical process stimulates a condition called metabolic stress response namely the release of stress hormones and various inflammatory mediators. The response to injury reflects both biochemical and hormonal impacts. Various markers of tissue damage and inflammatory conditions can be identified through blood and urine biochemical examinations.

Under conditions of metabolic stress, either due to surgery, trauma or burns and sepsis, there will be an increase in the breakdown of muscle protein which is characterized by increased loss of nitrogen through the urine, release of amino acids and inhibition of amino acid uptake by the muscles. Amino acids derived from healthy or injured muscles will be taken to the liver for the formation of glucose and protein synthesis. Negative protein balance reflects an imbalance between muscle building and breakdown where breakdown is more dominant. Amino acids transferred to the liver will be used for the synthesis of glucose and acute phase proteins such as fibrinogen, complement, C reactive protein, haptoglobin ferritin and others. The amount of acute phase protein synthesis is proportional to the severity of tissue damage. Other protein synthesis eg albumin, transferrin, retinol and prealbumin will decrease. Acute phase protein synthesis is stimulated by IL-1, IL-6, and TNF. Bacterial glucocorticoids and lipopolysaccharides.

Prognostic factors for detecting postoperative complications and impaired nutritional status can be seen from preoperative albumin levels. Serum albumin < 3 g/l needs attention. Hyperoxaluria is urinary oxalate excretion that exceeds 45 grams per day. Patients who experience this disorder mostly occur in patients who have undergone intestinal surgery and who consume a lot of oxalate-rich diets. Routine biochemical examinations such as complete blood count (hemoglobin, hematocrit, platelets, erythrocytes, leukocytes) are routinely performed to assess the general biochemical status of surgical patients such as

indications of infection and bleeding. Increases in blood sugar levels and urine nitrogen levels are important markers of metabolic changes in various tissues in the body.

CLINICAL AND PHYSICAL

General physical examinations such as blood pressure, body temperature, pulse, respiration rate/breathing are absolutely routine, both preoperatively and postoperatively. This examination is also an assessment of metabolic stress conditions as indicated by increased body temperature and blood pressure. The impact of surgery such as postoperative infection can also be seen from the physical examination which is marked by an increase in body temperature and signs of local inflammation around the index wound. The patient's physiological condition can also be detected from a physical examination which is generally marked withpoor wound healing, early fatigue, grip strength, resp muscle.

Assessment of the patient's clinical physical data is highly dependent on the diagnosis of the patient undergoing surgical therapy. Understanding the pathophysiological process of the patient's disease is able to provide direction for the next monitoring and evaluation process for clinical physical complaints that appear as signs and symptoms of the patient's disease. Overall physical examination which includes the central nervous system (consciousness), cardiovascular system, respiratory system, gastrointestinal function, urinary system, excretory system can be performed for comprehensive therapy of surgical patients

PATIENT HISTORY

Collecting patient history data as important information that determines diagnosis, intervention, and patient monitoring and evaluation. Patient history data includes

- Personal data, namely general patient/client data information such as age, gender, race, ethnicity, language, education and role in the family
- Patient/client/family medical/health history data. This data includes data on the patient/client/family's disease status and disease conditions that may impact nutrition and medical care/therapeutic data. This includes a history of drugs or supplements that are often consumed,
- Social history data includes socioeconomic factors, home situation, support for care/medical

D. NUTRITION DIAGNOSIS

Nutritional diagnosis is a form of nutritional problems or the risk of nutritional problems that are happening at this time and can change according to the patient's response. This nutritional diagnosis is a summary of nutritional problems, in which all data collected during the nutritional assessment is processed and identified as information. This information will be an input to the process of implementing a nutritional diagnosis. Writing structured nutritional diagnosis sentences with the concept of PES or etiological problems and sign/symtoms (ADA, 2008).

Nutritional diagnosis is one of the things that need to be considered to be able to provide adequate nutritional support for pre- and post-surgical patients. From the measurement of each assessment can be used to:

1) Identify the type of malnutrition
2) Supports malnutrition intensity
3) Deciding whether or not metabolic stress is present

Signs of metabolic stress include:

1) Highest temperature in 24 hours > 38°C
2) Pulse > 100/minute in the last 24 hours
3) Respiratory rate > 30 per minute in the last 24 hours
4) White blood cell count > 1200 or < 3000 in the last 24 hours
5) Positive blood culture
6) Active inflammatory bowel disease
7) Focus of infection

Some examples of diagnoses commonly found in postoperative patients include:

1) NI-2.1: Lack of oral food and drink intake related to no appetite is indicated by food intake of 63.2%
2) NC-2.2: Changes in body temperature related to the condition of patients who experience hypermetabolism due to burns are characterized by an increase in energy requirements
3) NB-1.1: Lack of knowledge related to food and nutrition related to never having received nutrition education before, characterized by unhealthy eating patterns, such as eating vegetables and fruit once per week, liking spicy and sour foods, and liking to eat instant noodles..

E. NUTRITION INTERVENTION

OBJECTIVES OF NUTRITION INTERVENTION

Nutrition Intervention is the third activity or step in the process of standardized nutrition care. Nutrition Intervention is a planned action aimed at improving nutritional and health status, changing nutritional behavior and environmental conditions that affect the patient's nutritional problems. The purpose of the nutrition intervention is to address the nutritional problems identified in the nutrition diagnosis.

Examples of nutritional interventions in surgical patients:

Diagnosis	:	Gastrointestinal dysfunction (P) associated with obstructive leus disease (E) characterized by pain in the stomach, nausea, and vomiting
Intervention Objectives	:	Accelerate the healing process and increase the patient's immune system
Intervention Plan	:	Provide education about post-surgery diet This activity is carried out by providing material on food arrangements for post-surgical patients and food selection, which foods can be consumed and limited. Nutrition education and counseling activities should involve the family especially in preparing food.

NUTRITIONAL NEEDS

Surgery is basically a trauma that will cause changes in physiology in response to trauma. In the process of surgery there will be disturbances in the physiology of vital organs (brain, respiratory system, cardiovascular system, liver, kidneys). In addition, there will also be changes in metabolism and changes in various tissues such as blood, lymphatic system, thymus and adrenal glands. These changes, among other things, will cause disturbances in the balance of nitrogen and carbohydrates, resulting in an increase in blood sugar levels and an increase in nitrogen levels in the urine (catabolism occurs).

Seeing the magnitude of the effects that occur as a result of the surgical process, it is necessary to regulate the right diet to minimize nutrient loss and provide nutrients to improve and support the patient's nutritional needs. Feeding routes may be limited by the patient's condition but whenever possible, oral feeding should always be the first choice.

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a. PRE- SURGERY DIET

Provision of a pre-surgical diet depends on the general condition of the patient, the type of surgery (such as incision, extripation, circumcision or circumcision), the nature of the operation (immediately in an emergency or cito and planning or elective), as well as the type of disease, both diseases that require surgery and other diseases. coexistence experienced by the patient. The aim of the pre-surgical diet is to maintain patient's nutritional status is in optimal condition at the time of surgery, so that reserves are available to deal with stress and wound healing.

Here are some of the nutritional requirements for the pre-surgical diet:

1) Energy Needs
   - For patients with poor nutritional status, 40-45 kcal/kg body weight is given
   - For patients with more nutritional status given normal energy requirements
   - For patients with good nutritional status, it is given according to normal energy requirements plus a stress factor of 15% of the AMB (Basal Metabolic Rate).
   - For patients with certain diseases, energy is given according to the disease
2) Protein Needs

- For patients with poor nutritional status, anemia, low albumin (<2.5 mg/dl) high protein 1.5-2.0 g/kg BW
- For patients with good nutritional status or obesity, normal protein is given 0.8-1 g/kg BW.
- For patients with certain diseases given in accordance with the disease.

3) Fat Needs
   - Adequate fat is given, namely 15-25% of total energy needs.
   - For patients with certain diseases given in accordance with the disease
4) Carbohydrate Needs
   - Carbohydrates are provided as a remainder of the total energy requirement to avoid hypermetabolism
   - For patients with certain diseases given in accordance with the disease
5) Vitamin Needs
   - Vitamins B, C, K are sufficient, if necessary can be added in the form of supplements
6) Mineral Needs
   - Enough minerals, If necessary, it can be added in supplement form
7) Fiber Needs
   - Low residue so that it is easy to clean the digestive tract so it doesn't interfere with the surgical process
8) fluid needs
   - If the patient's condition is normal, the fluid requirement is 1500-3000 ml/24 hours or 30-35ml/kg BW
   - If the patient's condition is hypovalemic or hypervolemic, attention must be paid between incoming and outgoing fluids
9) Types, Indications, and Duration of Diet

   According to the type and nature of surgery, the pre-surgical diet is given with the following indications:

   a. Emergency pre-surgery or cito: before surgery no particular diet is given
   b. Pre-surgery planning or elective: not given a specific diet
   c. Minor or minor pre-surgery does not require a specific diet, the patient is fasted 4-5 hours before surgery
   d. Major or major pre-surgery such as:

      - Pre-large gastrointestinal surgery given a low residue diet for 4-5 days with stages on the 4th day before surgery given soft food, 3rd day before surgery given filter food, 2nd and 1st day before surgery given leftover enteral formula low

      - Major Presurgery outside the gastrointestinal tract is given Low Residue Enteral Formula for 2-3 days. The last feeding in pre-major surgery is done 12-18 hours before surgery, while the last drink is 8 hours before.

Food ingredients that are recommended and not recommended are the same as those for soft food or filtered food/liquid food. The following are examples of food ingredients that are recommended and not recommended for filter food.

Table 26 Food Ingredients Recommendation

Food Ingredients	Recommended	Not Recommended
Carbohydrate Source	Sifted or blended rice, baked or pureed bread, crackers, biscuits, flours such as: rice flour, cornstarch, sago, hunkwee, oatmeal to make porridge or make pudding, granulated sugar, brown sugar, palm sugar, syrup	Glutinous rice, corn, cantel, sweet potato, taro, cassava
Sources of Animal Protein	Meat, boneless chicken and fish, ground, mashed, ½ cooked boiled eggs or mixed in food or drink, milk, yogurt	Fatty meat and chicken, fried chicken, fish and eggs, preserved meat such as jerky, smoked, preserved fish such as jerky and smoked, fish with many thorns such as milkfish, mujair, mas and selar
Vegetable Protein Sources	Tempeh and tofu ground, filtered or mashed green beans, soy milk	Nuts and processed products such as tempeh and fried tofu
Vegetables	Vegetables are low in fiber and filtered or mashed like spinach, carrots, pumpkin, chayote and tomatoes	Raw vegetables, vegetables that cause gas such as radish, cabbage, mustard, vegetables with a lot of fiber such as cassava leaves, young jackfruit and keluwih
Fruits	Fruit that is not a lot of fiber is filtered or made into juice or mashed like papaya, watermelon, melon, banana, orange	Fruits that have a lot of fiber and/or cause gas, such as jackfruit, durian, kedondong, pineapple
Ball-ball	Seasonings that are not sharp in limited quantities, such as salt and soy sauce	Sharp spices like chili and pepper
Drink	Weak tea, weak coffee, chocolate in limited quantities	Drink Which containing alcohol such as beer, whiskey, drinks containing soda such as sparkling water, bottled soft drinks/*soft drink*

Source: Instalasi Gizi Perjan RSCM dan AsDI (2006)

b. POST-SURGERY DIET

The post-surgery diet is the diet given to the patient after undergoing surgery. The principle of managing food after surgery depends on the type of surgery and the type of comorbidities (see pre-surgical diet). The post-surgical diet aims to strive for the patient's nutritional status to return to normal soon to speed up the healing process and increase the patient's immune system. This can be provided by providing basic needs (fluid, energy, protein), replacing losses of protein, glycogen, iron, and other nutrients, and correcting electrolyte and fluid imbalances.

Some of the post-surgery dietary requirements include providing food gradually starting from liquid, filtered, soft, and regular forms. Feeding from stage to stage depends on the type of surgery and the patient's condition, such as after minor surgery, trying to get food back as soon as possible to usual or normal food, after major surgery, and food is given carefully according to the patient's ability to accept it. Here are some

types of diet and indications:

1) Post-Surgery Diet I PSD I)
   This diet is given to all patients as follows:
   - Post-minor surgery: after sobering up or the nausea is gone
   - Post-major surgery: after waking up and the nausea is gone and there are signs that the intestines have started working

   How to feed:
   - For 6 hours after surgery, food is given in the form of water, sweet tea, or other fluids such as clear liquid food
   - This food is given in the shortest possible time, because it is lacking in all nutrients
   - Provide parenteral food as needed
   - Food ingredients are given gradually according to the ability and condition of the patient, starting from 30 ml/hour in the form of clear liquid food
   - Food ingredients that may be given include tea, fruit juice, syrup, sugar water, clear broth, and easily digestible liquids such as liquids containing maltodextrin. Meals can be supplemented with high-energy, low-residual supplements
2) Post-Surgery Diet II (PSD II)
   This diet is given to patients after major gastrointestinal surgery or as a change from the Post-Surgery Diet I

   How to feed:
   - Food is given in viscous liquid form, in the form of clear broth, syrup, fruit juice, soup, milk and pudding on average 8-10 times a day as long as the patient is not sleeping
   - The amount of fluid given depends on the condition and condition of the patient
   - Parenteral nutrition is given when needed
   - DPB II is given for the shortest possible time because it lacks nutrients
   - Foodstuffs in the Post-Beda Diet II are in the form of viscous liquid food with gradual administration starting at 50 ml/hour
   - Foods that are not allowed on the Post-Surgery Diet II are orange juice and drinks that contain carbon dioxide

Table 27 Recommended Food Ingredients in the Post-Surgery II/Liquid Diet

Group of Food Ingredients	Food Ingredients
Carbohydrate Source	Potatoes, gelatin, tapioca are made into pudding
Source of Protein	Milk, ice cream, yogurt, chicken eggs, ground tofu, margarine, butter
Fat Source	Margarine, butter
Vegetables	Vegetables are juiced and thickened with gelatin
Fruits	Fruits are made into juices, jellies and purees
Spice	Salt, shallots, sugar, soy sauce

Source: RSCM Perjan Nutrition Installation and AsDI (2006)

3) Post-Surgery Diet III
   Post-Surgical Diet III is given to patients after major gastrointestinal surgery or as a change from the Post-Surgical Diet II

   How to feed:
   - The food given is filtered food plus milk and biscuits
   - Fluid should not exceed 2000 ml per day
   - Can be given parenteral food if needed
   - Foods that are not recommended for the Post-Surgery Diet III are foods with sharp spices and drinks that contain carbon dioxide

Table 28 **Recommended and Not Recommended Food Ingredients in the Post-Surgery Diet III/Form of Filter Food**

Food Ingredients	Recommended	Not Recommended
Carbohydrate Source	Sifted or blended rice, baked or pureed bread, crackers, biscuits, flours such as: rice flour, cornstarch, sago, hunkwee, oatmeal to make porridge or make pudding, granulated sugar, brown sugar, palm sugar, syrup	Glutinous rice, corn, cantel, sweet potato, taro, cassava
Sources of Animal Protein	Meat, boneless chicken and fish, ground, mashed, ½ cooked boiled eggs or mixed in food or drink, milk, yogurt	Fatty meat and chicken, fried chicken, fish and eggs, preserved meat such as jerky, smoked, preserved fish such as jerky and smoked, fish with many thorns such as milkfish, mujair, mas and selar
Vegetable Protein Sources	Tempeh and tofu ground, filtered or mashed green beans, soy milk	Nuts and processed products such as tempeh and fried tofu
Vegetables	Vegetables are low in fiber and filtered or mashed like spinach, carrots, pumpkin, chayote and tomatoes	Raw vegetables, vegetables that cause gas such as radish, cabbage, mustard, vegetables with a lot of fiber such as cassava leaves, young jackfruit and keluwih
Fruits	Fruits that don't contain a lot of fiber are filtered or made into juice or mashed like papaya, watermelon, melon, bananas, oranges	Fruits that contain a lot fiber and/or generate gas such as jackfruit, durian, kedondong, pineapple
Ball-ball	Limited amounts of non-sharp seasonings, such as salt and soy sauce	Sharp spices like chili and pepper
Drink	Weak tea, weak coffee, chocolate in limited quantities	Drinks containing alcohol such as beer, whiskey, drinks containing soda such as sparkling water, bottled soft drinks

Source: RSCM Perjan Nutrition Installation and AsDI (2006)

4) Post-Surgery Diet IV (DPB IV)
Post-surgical IV diet given to:

- Post-surgery small patient, after Post-Surgery Diet I
- Major post-surgery patient, after Post-Surgery Diet III. Means of feeding:
- Food is given in the form of soft food which is divided into 3 full meals and 1 snack
- The food ingredients used in the IV Post-Surgery Diet are the same as soft foods. If the staple food in the form of porridge or tim is not finished, as a substitute, snacks are given at 16.00 and 22.00 in the form of 2 biscuits or 1 portion of pudding and 1 glass of milk
- Foods that are not recommended for the IV Post-Surgery Diet are foods with sharp spices and drinks that contain carbon dioxide (CO2).

The following are examples of foods that are recommended and not recommended for a post-IV surgery/soft food diet:

Table 29 Recommended Foods on the IV Post-Surgical Diet/Soft Food Form

Food Ingredients	Recommended	Not Recommended
Carbohydrate Source	Steamed rice, porridge, boiled potatoes, pureed, macaroni, glass noodles, noodles, boiled misoa, bread, biscuits, sago flour, tapioca, cornstarch, hunkwe porridge or made into pudding, sugar, honey	Fried rice, glutinous rice, sweet potato, cassava, taro, cantel
Sources of Animal Protein	Meat, fish, chicken, boiled, steamed, steamed, baked lean poultry, boiled eggs, watered, scrambled, fish balls, braised beef or chicken, milk, milk shakes, yogurt, cheese	Fatty and highly veined meat and chicken, fried chicken, fish and eggs, fish with lots of spines such as milkfish, mujair, mas and selar
Vegetable Protein Sources	Tempeh and tofu are boiled, steamed, sautéed, baked, boiled green beans, soy milk	Tempeh, fried tofu and beans, red beans
Vegetables	Vegetables that do not have a lot of fiber and are cooked such as spinach leaves, kale leaves, young long beans, young green beans, peeled young squash, chayote, pumpkin, water pumpkin, tomatoes and carrots	Vegetables with a lot of fiber such as cassava leaves, katuk leaves, melinjo leaves, young jackfruit, keluf, gengar, lung, krokot, bamboo shoots, vegetables that cause gas such as cabbage, mustard, radish, raw vegetables
Fruits	Pureed or pureed fresh fruit without skin such as ripe banana, papaya, sweet orange and fruit juices (in patients who have low tolerance for acids, sour fruit juices are not given)	Fruits are high in fiber and cause gas such as pineapple, jackfruit, ripe and durian, other fruits in their intact state except bananas, dried fruit
Ball-ball	In limited quantities, seasonings: salt, sugar, nutmeg, cinnamon, tamarind, tomato sauce, soy sauce	Chili and pepper
Drink	Syrup, weak tea and coffee, vegetable and fruit juices, boiled water	Drinks containing alcohol and soda such as beer, whiskey, lemonade, sparkling water, coca cola, orange crush, strong tea and coffee
Intermezzo	Ice cream, pudding	Nut cake, walnut cake, dried fruit, too sweet and fatty cake
Others	Jam, cocoa powder, gelatin, hagelslag	Chips and snacks are too tasty

Source: RSCM Perjan Nutrition Installation and AsDI (2006)

5) Post-Surgery Diet Through Gastric Tube

Post-Surgery Diet Through a Gastric Tube is the provision of food for patients in special circumstances such as coma, burns, psychological disorders, where food must be given through a gastric or enteral tube or Naso Gastric Tube (NGT). Here's how to feed:

- Food is given as full viscous liquid food, namely 1 kcal/ml, as much as 250 ml every 3 hours when not sleeping.
- Food is expected to stimulate gastric peristalsis
- Foodstuffs on the Post-Surgery Diet Through Gastric Tube are the same as Viscous Liquid foods
-

Table 30 Recommended Food Ingredients in the Post-Surgery Diet Through Gastric Tubes/Thick Liquid Foods

Group of Food Ingredients	Food Ingredients
Carbohydrate Source	Potatoes, gelatin, tapioca made into pudding
Source of Protein	Milk, ice cream, yogurt, chicken eggs, ground tofu, margarine, butter
Fat Source	Margarine, butter
Vegetables	Vegetables are juiced and thickened with gelatin
Fruits	Fruits are made into juices, jellies and purees
Spice	Salt, shallots, sugar, soy sauce

Source: RSCM Perjan Nutrition Installation and AsDI (2006)

6) Post-Surgery Diet Through the Jejunum Tube

The Post-Surgery Diet through the Jejenun Tube is the provision of food for patients who unable to receive food through the mouth or stomach tube. Food is given directly into the jejunum or jejunum feeding fistula (JFF). Here's is how the food is admistered:

- Food is given as a liquid diet that does not require gastric digestion and does not stimulate the jejunum mechanically or osmotically
- Liquids are given drop by drop slowly, so that diarrhea or cramps do not occur. This diet is given in a short time because it lacks energy, protein, vitamins, and iron

F. MONITORING AND EVALUATION

The next step, which is the final step in the process of standardized nutrition care, is nutrition monitoring and evaluation. This activity is carried out to determine the patient's/client's response to the intervention and its success rate. Monitoring and evaluation is carried out by monitoring progress, measuring results and evaluating results. In nutrition monitoring and evaluation, data is used to evaluate the impact of appropriate nutrition interventionsoutcome and nutritional care indicators. Indicators that can be used to measure the success of these nutritional interventions are food and drink intake (consumption during hospitalization), this intake is monitored daily, laboratory values related to nutrition, changes in body weight.

ESPEN'S GUIDE TO CLINICAL NUTRITION THERAPY IN SURGICAL CONDITIONS

In surgical patients, the indications for nutritional therapy are the prevention and treatment of catabolism and malnutrition. This affects the maintenance of perioperative nutritional status to prevent postoperative complications. These guidelines are based on the best currently available evidence and it must be emphasized that the application of the guidelines in specific areas and in specific patient cases may need further adjustment. The recommended guidelines from ESPEN are as follows:

1. It is recommended to adjust the oral intake according to individual ability and the type of surgery performed, especially in elderly patients.
2. Nutritional status assessment was conducted before and after surgery.

3. Preoperative fasting from midnight is not required. Patients undergoing surgery without risk of aspiration are encouraged to drink water/clear beverages such as tea up to 2 hours before anesthesia. Solid food may be consumed up to 6 hours before anesthesia.
4. Carbohydrates can be given the night before and two hours before surgery to influence insulin resistance and length of hospital stay. Carbohydrates can be given in liquid/drink form (CHO-loading)
5. In general, oral nutrition including clear fluids should be given a few hours post-surgery.
6. Perioperative nutrition therapy is indicated in patients at risk of malnutrition. Perioperative nutrition therapy should also be performed if the patient is expected to be unable to eat for >5 days, patients who lack oral intake and cannot maintain 50% of intake requirements for >7 days. In this case enteral nutrition therapy is recommended.
   Except by contradiction:
   - Intestinal obstructions
   - Severe shock
   - Intestinal ischaemia
   - High fistula
   - Intestinal bleeding / severe intestinal haemorrhage
7. If energy requirements cannot be met by oral and enteral (<50% intake) for more than 7 days, a combination of enteral and parenteral intake is necessary. Parenteral nutrition should be started as soon as possible if there is a contradiction to enteral nutrition such as intestinal obstruction.
8. Standard operating procedures (SOPs) for nutrition support are recommended to secure effective and safe nutrition support therapy.
9. Glutamine supplementation in standard doses can be considered to be given to patients who cannot eat enterally. However, the extent of the positive impact of parenteral glutamine administration cannot be clarified due to the lack of available data. There is no clear recommendation for the indication of glutamine and arginine supplementation.
10. Pre- and postoperative administration of enriched-formula immunonutrients (arginine, omega-3-fatty acids, ribunocleotides) should be given to patients undergoing major cancer surgery. There is currently no clear evidence for the use of immunonutrients enriched-formula compared to oral supplementation.
11. Patients with severe nutritional risks should receive nutritional therapy before major surgery, including surgery for cancer needs to be postponed during nutritional therapy 7 to 14 days
12. It is better to go through the oral or enteral route if possible.
13. If the patient does not meet their energy needs from food, they are encouraged to take oral nutritional supplements during the pre-operative period.
14. Before surgery, oral nutritional supplements should be given to all malnourished cancer patients and high-risk patients undergoing abdominal surgery. A special group of high-risk patients are elderly people with sarcopenia.
15. Oral nutritional supplements for immunity including arginine, omega-3 fatty acids and nucleotides can and are given for five to seven days before surgery.
16. Pre-operative enteral nutrition / oral nutritional supplements should be given before hospital admission to avoid unnecessary length of stay and to lower the risk of nosocomial infections.
17. Patients who use enteral nutrition can be reassessed for nutritional status while in the hospital, and diet counseling is carried out after discharge. It is recommended for patients who have received perioperative nutrition therapy and are still not meeting their energy needs through oral intake.
18. Postoperative parenteral nutrition including omega 3 fatty acids can be given to patients who cannot be fed enterally and require parenteral nutrition.
19. For parenteral intake, an all-in-one rather than a multibottle system is recommended.
20. Pre-operative Parenteral Nutrition should be given only in patients with severe malnutrition or nutritional risk where energy requirements cannot be met by enteral for a period of 7-14 days.
21. Early tube feeding (within 24 hours) should be given to patients who are unable to eat orally, and do not meet oral intake (<50%) for more than 7 days.
    Special risk group patients
    - Patients undergoing major head and neck surgery or pancergastrointestinal surgery

- Patients with severe trauma including brain injury
- Patients with obvious malnutrition at the time of surgery

22. In most patients, a standard whole protein formula can be used. For technical reasons such as clumping of the tubes and risk of infection, the use of blenderized diets for tube feeding is not recommended.
23. The types of tube feeding that can be provided for patients undergoing major upper gastrointertinal and pancreatic surgery are Naso Jejunal tube (NJ) or Needle Catheter Jejunostomy (NCJ).
24. If tube feeding is used, it should be done within 24 hours after surgery, at a low flow rate (10 - 20 ml/hour) and increased carefully due to limited gut tolerance. The time to reach the target intake may vary, which could be 5-7 days. If long-term tube feeding is required (> 4 weeks) such as in severe head injury, percutaneous tubes such as percutaneous endoscopic gastrostomy (PEG) may be used.
25. For patients undergoing organ transplantation, it is necessary to monitor their nutritional status. Assessment of nutritional status is necessary when monitoring patients before transplantation. Malnutrition is a major factor affecting outcomes after transplantation, so in malnourished patients undergoing organ transplant surgery, supplemental oral nutrition or even tube feeding is recommended. Recommendations for donors and recipients do not differ from those for patients undergoing major abdominal surgery.
26. Early intake of normal food or enteral nutrition is advised within 24 hours after heart, lung, liver, pancreas and kidney transplantation. Even after small bowel transplantation, enteral nutrition can be started early, but should be increased with great care within the first week. Enteral and parenteral nutrition can be combined if required. Long-term nutritional monitoring and dietary counseling are recommended for all transplants.
27. In patients undergoing bariatric surgery, early oral intake may be recommended after surgery. Parenteral nutrition is not required in uncomplicated bariatric surgery. If complications occur with relaparotomy, a Naso Jejunal tube (NJ) or Needle Catheter Jejunostomy (NCJ) may be used.

ESPEN GUIDELINES ON PARENTERAL NUTRITION IN SURGICAL CASES

Surgical patients often require supportive nutritional therapy through the parenteral route both preoperatively and postoperatively. Here are espen's guidelines regarding parenteral nutrition in surgical conditions.

1. Pre-operative parenteral nutrition therapy should be given to patients with severe malnutrition who cannot meet their oral and enteral nutritional needs.
2. Parenteral nutrition is beneficial in the following circumstances:
   - In patients who are malnourished from inappropriate or intolerable enteral nutrition; in patients with postoperative complications that impair gastrointestinal function who are unable to receive and absorb adequate amounts of oral/enteral food for at least 7 days.
   - For patients who require postoperative artificial nutrition, enteral nutrition or a combination of enteral and supplemental parenteral nutrition is the first choice.
   - A combination of enteral and parenteral nutrition should be considered in patients with nutritional indications and >60% of their energy needs are not met via the enteral route, for example in high output enterocutaneous fistulae, or in patients whose partially benign or malignant gastrointestinal lesions do not allow enteral refeeding.
   - In patients with surgical obstruction lesions, it should not be delayed due to the risk of aspiration or severe bowel distension leading to peritonitis.
   - In patients with prolonged gastrointestinal failure.
3. Preoperative metabolic preparation can be done with preoperative carbohydrate loading via oral route. In patients who cannot eat or are not allowed to drink before surgery, it can be given by intravenous route.
4. Calculation of energy and protein requirements in the pre-operative period:
   - Ideal weight calculation: 25 kcal/kgBWI or in patients with severe stress conditions can be calculated with 30 kcal/kgIBW.
   - Protein requirement under illness/stress: 1.5 g/kgBW (20% of total energy) to prevent nitrogen loss

- The calorie ratio of protein : fat : glucose should be close to 20:30:50%
- The ratio of glucose:fat calories is 60:40 or 70:30 of non-protein calories because of the problems associated with hyperlipidemia and fatty liver, sometimes with cholestasis and in some cases non-alcoholic steatohepatitis.

5. The optimal parenteral nutrition mix is with all components of parenteral nutrition given simultaneously for 24 hours.
6. In patients without serious comorbidities, no specific nutrition is required per person, and standard nutritional support can be provided. However, in some situations, standard nutritional support is not possible, such as:
   - Heart failure patients: need more concentrated nutrition with less volume and require sodium restriction.
   - Patients with chronic renal failure and oliguria: require sodium and potassium restriction in small total volumes. Protein restriction is not recommended to avoid aggravating malnutrition.
   - Patients with liver failure: patients require normal amounts of protein and BCAA amino acids up to 1.2 - 1.5 g protein/kgW for induction of hepatic encephalopathy.
   - Patients with intestinal failure: require electrolyte (Na and Mg) and vitamin supplementation.
7. Addition of specific nutrient content:
   - Parenteral nutrition for critically ill surgical patients should include n-3 fatty acids.
   - In well-nourished patients recovering through oral or enteral nutrition on postoperative day 5, vitamin and trace element supplementation is required.
   - In patients who cannot be fed by oral or enteral route after surgery, vitamins and trace elements should be supplemented daily by parenteral route.

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Dietetics Report Format

CHAPTER I
CASE STUDY

CHAPTER II
LITERATURE REVIEW

2.1 Disease Overview

2.2 Disease Risk Factors

2.3 Clinical Manifestations

2.4 Disease Pathophysiology

2.5 Diet Management

CHAPTER III
CASE PATHOPHYSIOLOGY

3.1 Pathophysiology Framework

3.2 Pathophysiology Explanation

C

HAPTE

R IV

NUTRIT

ION

CARE

PROCE

SS

4.1 Assesment

Code/Indicator	Assessment results	Standard Value	Conclusion
Food History			
FH-1.1. Nutrient Intake (quantitative)			
Dietary habit			

Drugs Consumption			
Physical Activity			

Food History Domain Conclusion:			
Anthropometry			
Anthropometry Domain Conclusion:			
Biochemistry			

Biochemistry Domain Conclusion:			
Physical/Clinical			
Physical/Clinical Domain Conclution:			

Client History		
Code	**Assesment Result**	**Conclution**
Client History Domain Conclution:		

4.2 Diagnosis

Code	Diagnosis
	..... (P) related to ..... (E) marked with (S).

4.3 Intervention

Goals:
Diet Principles:

Diet Requirements:

Calculaion of Needs:

	Type of Diet, Form of Food	**Way of giving**	**Frequency**	

4.4 Functional Food

Food Sources	**Bioactive Substances**	**Usage**

4.5 Menu Planning

Name of Menu	Food Ingredients	Weight		E	P	F	CH	Micro 1	Micro 2
		HHM	Gram						
Type of Food : (Meal/Snack)		**Meal Time: (Morning/Afternoon/Dinner)**						**Time :**	
Subtotal									
%Fulfillment									
Type of Food : (Meal/Snack)		**Meal Time: (Morning/Afternoon/Dinner)**						**Time :**	
Subtotal									
%Fulfillment									
Type of Food : (Meal/Snack)		**Meal Time: (Morning/Afternoon/Dinner)**						**Time :**	
Subtotal									
%Fulfillment									
Type of Food : (Meal/Snack)		**Meal Time: (Morning/Afternoon/Dinner)**						**Time :**	
Subtotal									
%Fulfillment									
Type of Food : (Meal/Snack)		**Meal Time: (Morning/Afternoon/Dinner)**						**Time :**	

Subtotal									
%Fulfillment									
Total									
Requirement									
%Fulfillment									

4.6 Drug and Food Interactions

Medicine name	Dose	Usage	Interaction with Food

4.7 Education/Counseling

Objective:
Materials:
Media:
Target:

Method, Duration:

4.8 Monitoring dan Evaluation

Parameter	Time	Method	Achievement Targets
Anthropometry			
Biochemistry			
Physical/Clinical			
Food History			

BIBLIOGRAPHY

NCP Preparation Work Instructions

1. ASSESSMENT

Indicator	Standard	Evaluation	Conclusion
Food History (FH)			
Intake of Nutrients (Quantitative)			
Dietary Habit			
Drugs Consumption			
Physical Activity			

Indicator	Standard	Evaluation	Conclusion
Anthropometry Data			
.	.	.	.

Biochemical Data

Physical Data (PD)

Client History (CH)

2. PATOPHYSIOLOGY

pathophysiology of the disease is designed based on the risk factors that cause the disease in patients case study

3. DIAGNOSIS

	Diagnosis	Inervention
P		**Objective :**
E		**Implementation :**
S		

	Diagnosis	Inervention
P		**Objective :**
E		**Implementation :**
S		

	Diagnosis	Inervention
P		**Objective :**
E		**Implementation :**
S		

4. INTERVENTION

Form	Implementation
ND – Feeding	**Diet Prescription (Type of diet, Form, Route, Frequency food, nutritional value)**
Form	**Implementation**

NE – Education	**Education Materials**

NC – Counseling	**Counseling Materials**
RC – Coordination of nutrition services	**Coordination form**

5. MONITORING AND EVALUATION

Monitoring	**Evaluation**
Food History (FH)	
Antropometry Data (AD)	
Monitoring	**Evaluasi**

Biochemical Data (BD)	

Menu According to Diet Prescription

Name of Menu	Food Ingredients	Weight		E	P	F	CH	Micro 1	Micro 2
		HHM	Gram						
Type of Food : (Meal/Snack)		**Meal Time: (Morning/Afternoon/Dinner)**						**Time :**	
Subtotal									
%Fulfillment									
Type of Food : (Meal/Snack)		**Meal Time: (Morning/Afternoon/Dinner)**						**Time :**	
Subtotal									
%Fulfillment									
Type of Food : (Meal/Snack)		**Meal Time: (Morning/Afternoon/Dinner)**						**Time :**	
Subtotal									
%Fulfillment									
Type of Food : (Meal/Snack)		**Meal Time: (Morning/Afternoon/Dinner)**						**Time :**	
Subtotal									
%Fulfillment									
Type of Food : (Meal/Snack)		**Meal Time: (Morning/Afternoon/Dinner)**						**Time :**	

Subtotal									
%Fulfillment									
Total									
Requirement									
%Fulfillment									

Practicum Work Instructions (Cooking)

1. Defining Menu Arrangement Goals

Name	
Diet Prescription	
Jobs/Activity	
Age	yr
Gender	Male Female*)
Body weight	Kg
Height	Cm
Energy Requirement Calculation	Formula: Calculation:
Physiological Conditions related to Nutrition	(eg: difficulty chewing in infants and elderly, nausea and vomiting in pregnant women, etc.)
Economic Conditions	
Environmental conditions	Rural/Urban*)
Allergy history	

Note: *) cross out unnecessary

2. Describe the physiological condition of the patient

a. General Physiological Condition

b. Spesific Physiologycal Condition to Intervention through Diet Menus

3. **Determining the Type of Nutrients to Fullfill through the Diet Menus** (Minimum 1 Macro Nutrient and 2 Micro/Bioactive Nutrients)

   a. Types of Macro Nutrients : .....
   - Role of Nutrients in supporting the patient's physiological condition

- Nutrient Characteristic

- Sources of Nutrients

b. Type of Micronutrient/Bioactive 1 : .....

- Role of Nutrients in supporting the patient's physiological condition

- Characterictic of Nutrients

- Source of Nutrients

4. Determining Energy Needs and Macro/Micro/Bioactive Nutrients Target

Energy	
Protein	
Fat	
Carbohydrate	
Micronutrients / Bioactive	
Micronutrients / Bioactive	
Micronutrients / Bioactive	

5. Determining Food Materials and Processing Techniques to be Performed

Materials	Nutrient Content	Processing Techniques

6. Arranging Balanced Menu for Clients

Name of Menu	Food Ingredients	Weight		E	P	F	CH	Micro 1	Micro 2
		HHM	Gram						
Type of Food : (Meal/Snack)		Meal Time: (Morning/Afternoon/Dinner)					Time :		
Subtotal									
%Fulfillment									
Type of Food : (Meal/Snack)		Meal Time: (Morning/Afternoon/Dinner)					Time :		
Subtotal									
%Fulfillment									
Type of Food : (Meal/Snack)		Meal Time: (Morning/Afternoon/Dinner)					Time :		

Subtotal									
%Fulfillment									
Type of Food : (Meal/Snack) **Meal Time: (Morning/Afternoon/Dinner)** **Time :**									
Subtotal									
%Fulfillment									
Type of Food : (Meal/Snack) **Meal Time: (Morning/Afternoon/Dinner)** **Time :**									
Subtotal									
%Fulfillment									
Total									
Requirement									
%Fulfillment									

7. Analyzing the Advantages and Disadvantages of Arranged Menus

(The advantages/disadvantages of the menu can be seen in terms of energy and nutrient content, economic value of the menu, processing methods/type of menu dishes, food ingredients used, etc.)

a. Menu Advantages

b. Disadvantages and Solution

Disadvantages	Solution

Scoring

1. Tutorial Assessment Sheet

At the tutorial session, the aspects evaluated are*soft-skill* which cover:

1. Able to interact and work in groups
2. Able to issue relevant scientific opinion during the discussion
3. Active discussion
4. Discipline
5. Attitude

2. Presentation Assessment Sheet

At the tutorial session, the aspects evaluated are*soft-skill* and*hard-skill* which cover:

Softskill

a. Able to present case studies clearly and interestingly

Hard skills

a. Explain the pathophysiology of the disease according to the case with the method*mind map*
b. Able to carry out nutritional assessment (Assessment) according to the case
c. Able to perform nutritional diagnosis according to the case
d. Able to compile an intervention plan according to the case
e. Able to formulate menu recommendations according to the needs of the case
f. Able to compile an evaluation monitoring plan in accordance with the case