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on the topic “Care for the Surgical Patients. Nutrition of Patients during Postoperative Period” for students of medical higher schools

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Department of General Surgery, Radiation Medicine and Phthisiology

Contents

INTRODUCTION

Nutrition is one of the most important physiological needs of an organism. It is necessary for building and permanent regeneration of cells and tissues; energy supply is necessary for covering energy expenditure; inflow of matters, from which different enzymes, hormones and other regulators of metabolic process and vital functions are generated. Metabolism, function and structure of all cells, tissues and organs depend on nutrition. On this ground, intensive therapy of any surgical pathology is impossible without wholesome food.

Nutritious insufficiency during critic situations is a particular problem. The development of hypermetabolism, hypercatabolism with damage of albumens, carbohydrates, lipids is typical for metabolic reply on an aggression of any aetiology, also the intensified consumption of carbohydrates and lipids supplies, the break-up of tissues albumens and the loss of weight is significant. As a result, the concomitant insufficiency develops. After being in a hospital during 10–15 days, approximately 60–64 % of patients, especially those who withstood an operation or injury lose, on average, 10–12 % of body mass. Initial nutrition irregularities, nutrition insufficiency of a patient and unfit correction of metabolic irregularities reduce the effectiveness of treatment dramatically, especially after the operative intervention. Elimination of nutritious insufficiency improves the results of treatment, reduces the quantity and severity of postoperative complications (from 46 to 17 %) and lethality (from 11.7 to 6 %), reduces greatly terms spent in hospital (to 25 %) and the rehabilitation period, raises life quality indices of chronic patients, reduces twice costs of diagnostic and treatment and in 15–30 % reduces consumption of expensive medication.

It is rather difficult to solve the problem of nutritious insufficiency treatment by means of dietotherapy, because from the hospital total caloricity ration, in fact, a patient assimilates only approximately 60 %. A great role in insufficient assimilation of the hospital ration and in undernourishment progress belongs to the

patient's health condition – appetite loss, impairment of consciousness, fever, dyspeptic disorder, which lead to reducing virtual food consumption or to complete aversion to food. Besides, after surgery interventions, especially when they involve damages or functional defect of alimentary canal, a patient neither can nor wants, but also shouldn't take usual food. During the period, when natural way of replenishment of essential nutrient deficit is impossible or limited, particular importance belongs to parenteral nourishment combined with treatment.

General principles of the patient's nutrition after the surgical operation

A conducted adequate dietary treatment before and after an operation reduces complications chances and promotes a faster recovery. In the case of contraindications absence to ingestion, presurgical nutrition should create vitamins supplies in organism. A diet should contain 100–120 g of albumen, 100 g of adipose tissue, 400 g of carbohydrate. Energy value of food should consist of 2900–3000 kcal. Volume of liquid in the organism should be 2.2–2.5 litres. 3–5 days before an operation it is necessary to exclude food rich in cellulose, because it causes meteorism (beans, white cabbage, chiselly bread, millet, nuts, full-cream milk).

Nutrition during postsurgical period should:

– provide the partial load mode for target affected organs, especially after digestive organs surgeries;

– provide the metabolism normalization and rehabilitation of all organism functions;

– raise body resistance to all kinds of inflammations and intoxications;

– provide wound incisional healing.

After the abdominal operation starvation diets are often prescribed to patients. Liquid is administered intravenously, and mouth is only rinsed. Maximum sparing food (fluid, semi-fluid, grated) is prescribed step-by-step. It should also contain sufficient quantity of liquid, because such products assimilate the best. For prevention of meteorism a patient should exclude such food products as whole milk, concentrated sugar solution and cellulose. One of the most important tasks of medicinal nutrition is to overcome protein and vitamin deficiency during 10–15 days after an operation, which develops in great number of patients. The reason is hyponutrition during first days, hemorrhage, tissue proteins decomposition, fever. That is why, it is necessary sometimes to shift the patient's nutrition faster to biologically valuable food with the wide product list, but at

the same time, doctors should take into account the state of a patient, his food intake and gastrointestinal digestion capability.

It is necessary to reduce a phenomenon of metabolic acidosis by way of an inclusion of dairy products, fruits and vegetables into a diet. It should be noted, that patients often lose a lot of liquid after an operation. Approximate daily necessity in this period is 2–3 liters if that is noncomplicated case, 3–4 liters in complicated case (sepsis, fever and intoxication), 4–4.5 liters for serious patients who have a drainage. When it is impossible to provide a natural nutrition for operated patient, in this case the parenteral (intravenous) or nasojejunal feeding should be prescribed. Highly-nourishing water dispersible concentrates are especially indicative for nasojejunal feeding or drinking bowl.

Nutrition types of the surgical patients

Nutrition of the surgical patients can be: natural, artificial, enteral and parenteral.

Natural:

- active – patients eat by themselves keeping normal regimen;
- passive – nurses feed patients who keep bed regime.

During feeding a nurse should help a recumbent patient to take a sitting or semisitting position, breast and neck should be covered by a napkin. It happens rather often, that serious and debilitated patients should eat small serving, it should be a fluid diet (thick soup, clear soup, jelly, milk and so on). A patient sips with the help of a feeding cup or spoon. The best time to feed a febrile patient is after amelioration and decrease of temperature trying not to interrupt their daytime sleep especially in the case of insomnia.

A nurse should be especially tolerant to anorexic patients or to those patients who even suffer from fastidium (for example, during malignant tumour). In such cases, it is important to pay attention to make food tasty, freshly prepared and favorite dishes of a patient also should be included. Food taking should be held under the appropriate conditions (cleanness, neatness, absence of different revulsive moments).

Sometimes it happens, that natural feeding should be competed or entirely substituted by artificial feeding.

Artificial feeding

Artificial feeding is used when a patient can't eat by himself or when natural feeding for whatever reason (serious, debilitating disease, preoperative assessment or postoperative period) isn't enough. There are several ways of artificial feeding: by way of probe, which is input to the stomach; with the help of a PEG tube or a jejunal tube (an aperture surgically imposed in a stomach and a jejunum), as well as by means of parenteral administration of different drugs omitting digestive tract (from Greek *para* – near, *entera* – intestine). First two methods are often united in one notion of the probe or enteral feeding, because a probe is often used during application of a PEG tube or a jejunal tube.

Enteral feeding

Enteral feeding is a type of the nutrition intervention when nutrients in the form of special mixture are input with the help of peroral or nasogastric probe, nasojejunal catheter, PEG tube or jejunal tube or enema, when it is impossible to provide adequate caloric and flexible requirement of an organism by means of natural way during different diseases.

Enteral feeding is used when the functions of gastrointestinal tract are preserved, and it allows to use maximally and keep functional activity of intestine physiologically means, as a result enteral feeding has indubitable advantages in comparison with parenteral feeding.

Modifications of villous epithelium develop in an intestine, which is afunctional for a long time, in this case, a risk of bacterial translocation increases (microbial bodies penetrate from the lumen of the intestine into the free abdominal space and systemic blood).

A nutrient enema (NE)

A nutrient enema, also known as feeding per rectum, rectal alimentation, or rectal feeding, is an enema administered with the

intent of providing nutrition when normal eating is not possible. NE has a very long history, emerging in the ancient world and developing throughout the common epoch. This history dates back as far as 3500 BC to the ancient Egyptians, Indians, and Chinese. Their medical practices were the first reports of enteral feeding therapy, provided via rectum with enemas of wine, milk, whey, wheat, and barley. A variety of different mixes have been used for nutrient enemas throughout the history. A paper published in Nature in 1926 stated that because the rectum and lower digestive tract lack digestive enzymes, it was likely that only the end-products of normal digestion such as sugars, amino acids, salt and alcohol would be absorbed. A feeding enema did help keep President James Garfield alive for 80 days after he was shot by Charles J. Guiteau in 1881. He received a steady diet of beef bouillon, egg yolks, milk, whiskey, and drops of opium through his rectal cavity. Garfield died anyway, but he wouldn't have lasted nearly as long without all the egg yolks, liquor, and drugs they pumped up his rectum. The famous German surgeon T. Billroth appointed a nourishing enema that consisted of strong coffee with cognac in the first days after the operation of the stomach resection.

Parenteral nutrition

The obligatory balance for the normal functioning of the organism between apolexis and synthetic process gets broken either by enhanced metabolism, or by partial or complete inability to normal income and conversion of nutrients for various reasons. That may be found by almost all common diseases and injuries, followed by more or less expressed protein deprivation, fluid and electrolyte misbalance and other kinds of exchange. Although the protein deprivation is almost always followed by disorders and other sorts of exchanges the protein deprivation is still a critical factor in the complex of disorders, by the effect of the protein as the plastic material that is required for neogenesis, for enzyme, hormones, immune bodies and for other biological substances syntheses.

For many patients the protein deprivation is caused by the loss of large amount of protein and that is the result of proteolysis in

tela in cases of burn disease, severe traumas, febris, septic diseases, malignant tumours and in case of post-surgery period after serious surgical procedures.

Invariable indications for parenteral nutrition:

1. Preoperative preparation of patients who have the damages of pharynx, esophagus, stomach, when they have an obstruction for food to get through.

2. The first 3–7 days after pharynx surgery and digestive system surgery.

3. The first few days after the major thoracic organs and the retroperitoneal space surgeries.

4. Serious injuries and severe purulent–septic processes.

5. Severe postoperative complications (peritonitis, abscess, etc.).

6. Terminal states of life support.

Medications for parenteral nutrition

Medications for parenteral nutrition should be classified due to their effect on the human body: nitrogen sources, energy sources, medications for fluid and electrolyte balance.

The hydrolysate protein medications: casein hydrolyzate, hydrolysine, aminopeptid, aminokrovin.

The amino acid formula: polyamine, alvezin, aminol, infezol.

The fat emulsions: intralipid, lipofundin.

The sugars, polyhydric alcohols: glucose, sorbitol.

The electrolyte solutions: trisol, Ringer's solution, laktasol, etc.

The parenteral nutrition should be measured taking into account the needs of the organism, in other words it should be balanced.

Example: the calculation of total parenteral nutrition for a patient with the resection of a stomach, the resection of intestinal tract, etc. The patient's weight is 70 kg.

1. The daily requirement for calories is 2000–2200 kcal.

2. The daily protein requirement is 70–90 grams. Calories are provided mainly by carbohydrates, fat emulsions, alcohols.

1 g of glucose after combustion equals 4.1 kcal;

1 g of protein equals 4.1 kcal;

1 g of alcohol equals 7.2 kcal;

1 g of fat equals 9.3 kcal.

When calculating the total parenteral nutrition needs of protein as amino acids, it may provide about 300 kcal (4.1 · 70 = 280 kcal). So at this point the patient should be provided with about 2000 kcal. For the combustion of 6.25 g of protein it requires 150 kcal of energy, therefore for combustion of 70 g of protein (the daily requirement of protein) the patient needs 70 : 6.25 · 150 kcal. So here we have reached the approximate rate of the previously fixed calorage (about 2000 kcal).

The approximate scheme of parenteral nutrition: glucose 20 % – 1000 ml; aminopeptid – 800 ml; native plasma – 250 ml; Ringer's Solution – 800 ml; calcium chloride 1 % – 200 ml; magnesium sulfate 25 % – 10 ml.

The diets used for feeding of surgical patients

The number of diets that are applied in the health care centre depends on the local conditions and, especially, on the sort of patients. In a general surgery department diets that are used most of the time are: № 0–a, № 0–b, № 0–in, № 1–well, № 1, № 5–well, № 9, № 11, № 13, № 15.

The **"zero diet"** is prescribed for a patient who had a gastrointestinal tract surgery, and for patients with somnolency (like traumatic brain injury). This diet is attenuated for digestive organs, it prevents meteorism and provides nutrition when the intake of ordinary food is difficult or impossible to conduct. Sometimes the diets № 0–a and № 0–b are called surgical – № 1–a and № 1–b.

Diet № 0–a is usually prescribed for the 2–3^{d} days. It includes gelatinous and liquid dishes, 1.8–2.2 liters of free liquid and

food at the temperature under 45 °C. Food should be consumed 7–8 times a day with no more than 200–300 grams at a time. A fat-free broth, rice water with butter, berry jelly, strained compote, brewed for tea rose hips with sugar, fresh fruit and berry juices, tea with lemon. After 2–3 days when a patient has got better it is allowed to add a boiled egg and 50 ml of cream to the menu. Dense and puree meals, soft drinks, whole milk are forbidden.

Diet № 0–b is prescribed after 2–4 days after the diet № 0–a. Thin oatmeal, buckwheat, and rice porridge, cooked with meat broth or water, mucous cereal soups with vegetable broth, steamed egg white omelet, steamed lean fish soufflé or puree or steamed meat soufflé or puree are added to the previous diet. Food is given not more than 350–400 g per one meal 6 times a day. Diet № 0–b carries the previous diet and serves for an attenuated turning to a physiologically complete eating. This diet should include cream soups and mashed soups, steamed dishes made from mashed boiled meat, chicken or fish, fresh cottage cheese, sour milk drinks, mashed vegetable and fruit purees, 50–75 g of white breadcrumbs. It is allowed to add some milk to the porridge. The food is given 6 times a day.

Diet № 1–a is prescribed for the 6–7th days after the operations on the stomach. It is oriented on sparing the gastrointestinal tract mechanically, chemically and thermally in conditions of bed rest. For this diet food is cooked in liquid and semi-liquid form and taken in regular portions every 2–3 hours. For cooking dishes (steam soufflé or puree) low-fat fish or medium-fat meat are used. Soufflé from freshly made cottage cheese is limited. The patients consume whole milk, cream, unsalted butter, milky liquid cereals from grated cereals or baby food, homogenized vegetables, milk soup, mucus broths on milk, jelly, jelly from non-acidic berries, hard tea, wild rose tea. Substances that stimulate the secretion of the stomach, hot and cold dishes, including cheese, sour cream, plain curd, bread, flour and confectionery, fruits and berries

in raw condition, sauces, spices, coffee, cocoa, carbonated drinks are excluded.

Diet № 1 is prescribed after operations on the stomach as a transitional diet from diet № 1–a to physiologically nutritious diet. It is designed to reduce the inflammatory reaction and mucosal healing by limiting thermal, chemical and mechanical stimuli. Chemical composition and energy value of this diet is physiological. Dishes are cooked mostly in grated form, water-based or steamed. For cooking, low-fat meat and fish are used. It is allowed to use steamed chops, cues, soufflé, mashed potatoes, zrazas, beef stroganoffs, and vegetable broth jellies. Such dairy products as non-acid wiped cottage cheese, sour cream, cream cheese, dumplings, cheese cakes, rather watery milk porridge, pudding, steamed eggs or scrambled eggs are recommended. Dried wheat bread or yesterday's bread, boiled potatoes, carrots, beets, vegetable soup, sugar, honey, fresh ripe berries and fruits, weak cocoa, coffee with milk, fruit and berries juices are allowed. Too hot and too cold dishes are not allowed, also almost all sausage products as well as spicy and salty foods, strong broths, smoked foods, sour and unripe berries and fruits, chocolate, ice cream, kvass, black coffee are not allowed.

Diet № 5–a is used in cases of the acute cholecystitis after 3–7 days from the start of the disease, during the 5^{th} or 6^{th} day after the surgery on the bile passages and in cases of the acute pancreatitis. Mechanically and chemically gentle food sustain functional rest for all the digestive organs. Food should be cooked or creamed, it should be served preheated. There should be 5–6 meals per a day. Lean meat or fish in the form of smooth, low-fat curd, sour cream (it shouldn't be very sour) and cheese can be consumed. It is allowed to eat steamed scrambled eggs, porridges with half milk and half water, cooked pasta, white bread, biscuit (butter biscuit isn't allowed), mashed potato, milk jelly, strained dried fruits, honey, sugar, tea with milk or lemon, sweet fruit and berry juices, tomato juice, rose hips tea. It isn't allowed to consume products, which are extractives rich, row cellulose, fat and fried meals, smoked products, new and rye

bread, rich and flaky dough, mushrooms, cold snaps, chocolate, ice-cream, spices, cacao, black coffee, carbonated and cold drinks.

Diet № 9 is prescribed for those, who have diabetes mellitus. It helps to normalize carbohydrate metabolism. During this diet energy value is reduced gently by means of reducing carbohydrates and lipids content in food. Sugar and sweets are excluded from the nutrient budget, instead of them alternate materials, such as sodium chloride can be used. Lard sorts of meat and fish, brined cheese, rice, durum semolina and pasta, products made of rich and flaky dough and pickled vegetables, grape, raisins, banana, sugar, honey, jam, candy, ice-cream, sweet juice aren't allowed in terms of this diet.

Diet № 11 is prescribed for those, who have emaciated organism after surgery or traumas in the case of absence of alimentary system disorder. It helps to build up body defenses and to improve nutrition conditions. Products needed for this diet are rich in proteins, vitamins, minerals. Cooking and food temperature is standard. There should be 5 meals per a day, the quantity of free fluid shouldn't be more than 1.5 litre. Recommended list of products is various, beginning with meat and fish plates and ending with different starchy foods. The exception is very lardy meat and poultry, fats of mutton and beef, hot and fat sauces, cakes and mini gateau with a big amount of cream.

Diet № 15 is used in case of different types of disorder, which needn't special medical dietary regime, and serves also as a transitional phase to normal nutrition after using other diets. Its purpose is to supply a patient with physiologically adequate nutrition. The food contains proteins, lipids and carbohydrates in the quantity which is needed for healthy person, who isn't involved into physical activity, and vitamins should be consumed in increased amount. Cooking and food temperature is standard. The free fluid isn't limited. There should be 4–5 meals per a day. Daily consuming of cultured milk foods, fresh vegetables and fruits, juices, rose hips tea is recommended. Spices, lardy sorts of meat, lard of beef, mutton, pork should be excluded. After several surgical interferences and during several diseases natural food intake is impossible. In such

cases it is better to use artificial feeding: orally (with the help of probe or stoma), parenterally or in a combined way.

The food ration during postoperative period

The surgery on the soft tissues and bones. There is no need for special food ration in this case. The diet № 15 is often prescribed, but it should include the proper amount of native proteins, fresh fruits, vegetables and juices. If the operation was traumatic and was performed under the general anesthesia, then there should be used the diet № 1–a or the diet № 1–b.

Esophageal lumen surgery. Oral intake should be allowed not earlier than 5–6 days after the surgery. Prior to this there should be used the tube feeding diet or parenteral feeding. On the 7^{th} or 8^{th} day the first oral feeding is allowed: 100 ml of warm sweet tea (the patient should sip it) and 50 ml of rosehip tea; on the 8^{th} or 9^{th} day there are allowed two meals (200 ml of warm sweet tea with lemon and 160 ml of meat broth and 50 ml of rosehip tea), on the 10^{th} or 11^{th} day the meat broth, thin jelly, tea, cream – 50 ml, boiled egg, 20 g of butter. Liquid should be unlimited; on the 12^{th} or 15^{th} day the patient should have 6 meals. The size of one meal should be 100–200 ml. On these days tea, broth, soup of pureed cereals, cream, yogurt, sour cream, boiled egg and pureed fresh fruit juices are allowed; on the $16–22^{th}$ day the diet № 0–b should be used; on the $23–27^{th}$ day the diet № 0–v should be used; on the 28^{th} day the surgical diet № 1 should be used.

Stomach operations (resection etc.). During first 3–4 days after the operation the patient is not allowed to eat; on the 4^{th} day one glass of warm sweet tea and 50 ml of rosehip tea (one teaspoon of rosehip tea every 15–20 minutes) are allowed; on the 5^{th} day 4 cups of warm sweet tea and 50 ml of rosehip tea are allowed (using the spoon); on the 5^{th} or 6^{th} day (in case of normal peristalsis, absence of abdominal distention and passage of flatus) the diet №0–a should be prescribed (there allowed two more boiled eggs); on the $6–8^{th}$ day the diet № 0–b should be prescribed; on the $5–11^{th}$ day the diet № 0 should be prescribed; on the 12^{th} day the diet № 1 or the surgical diet № 1 should be prescribed.

Operations on the biliary tract (cholecystectomy etc.). During 2–3 days – hunger; on the 3–4th day – diet № 0–a; on the 5–7th day – diet № 0–b and № 0–c. In these diets meat broths are replaced with slimy soups, eggs – with steamed protein omelettes; on the 8–10th day diet № 5–a is prescribed; on the 15–16th day – diet № 5. Within 10–14 days after the operation fat in the diet is limited (not more than 40 g per day). In addition they limit cholesterol-rich foods.

Resection of the small intestine. Up to 3 days – hunger; on the 4–5th day – diet № 0–a; on the 6–10th day – diet № 0–b; on the 11–14th day – diet № 0–c. From the 15th day after the operation the diet № 1 is prescribed. Later diets № 4–b and № 4–c are used.

Appendectomy. 1–2 day diet № 0–a; on the 3–4th day diet № 0–b or № 0–c; from the 5th day the surgical diet № 1 is prescribed and then – diet № 2 or № 15.

Rectum surgery (resection for polyps). 1–2 days go without food; on the 2–3rd day thin and jelly dishes are allowed: these can be 200 ml of fat-free meat broth or chicken broth and 10 g of butter; tea with lemon and 15 g of sugar; fruit jelly; rosehip tea; on the 3–4th day the soft-boiled egg, steamed glairy omelette and cream are to be added; on the 4–5th day – meat soufflé and farmer cheese steamed soufflé are to be added; on the 6th or 7th day the diet should include semolina cooked with milk and mashed buckwheat porridge, mashed potatoes, rice soup with mashed vegetables, vegetable cream soup, meat and rice, meat custards, farmer cheese with cream, sour cream, curdled milk, baked apples squash, blueberry jelly. Such a diet is less harsh for the rectum, it does not cause flatulence, and the small amount of stools is formed. The patient should eat 7 times a day a little at a time. Then the diet № 0–b is prescribed on the 8th and 9th day; on the 10–15th day the diet № 0–b should be prescribed; on the 16th day the surgical diet № 1 should be prescribed.

When it comes to less complex operations, (cracks, hemorrhoids, fistulas) the surgical diet № 1 should be prescribed on the 8th day and later the patient should have a crossover to the diet № 15. With the absence of a stool from the 7th day, squash of dried apricots and prunes should be prescribed as well as boiled beets, kefir and other soft laxative products are to be included to the diet.

The feeding of critically ill patients

The feeding of critically ill patients requires a special approach and includes some difficulties due to the decrease in appetite and weakness of the masticatory and swallowing movements that appear due to the limitation of the motor activity of this kind of patients. In such cases, the patient needs to be fed more often, in small portions, with a spoon. In this diet allowable and prohibited foods should be considered. Thick food should be diluted with milk, broth or juice and after ingestion allow the patient to drink after from an appetizer or spoon. Feeding of the patient is necessary in quiet atmosphere, without distracting his or her attention, for example, by light stimuli or by conversations. Feeding of the critically ill patients is carried abed. To make this the patients should have sitting or semi-sitting position, or the head of a patient should be a little bit lifted on a hand of a nurse. While feeding any hurry is allowed, otherwise the patient can choke. It is important to ensure that food is not too hot or too cold. The number of feedings is usually increased to 5–6 times a day with a relatively small amount of food at one time.

Feeding of critically ill patients

• Help the patient to take a comfortable semi-sitting position in bed, by placing an additional pillow. Wash his or her hands. Prepare a bedside table. Give the patient time to prepare for meals.

• Cover the patient's neck and chest with a napkin. Hot dishes should be checked if they are not too hot by dripping a few drops on your wrist.

• To feed the patient with spoon-food, use a spout cup (you can use a small teapot).

• Semifluid food is given to the patient with a spoon.

• It is necessary to discuss with the patient before the feeding, in what sequence he will take food. Ask the patient not to talk while eating, because during the conversation, food can get into the airways.

• Do not insist the patient to eat the entire amount of food you cooked. After a short break, warm up the food, continue feeding.

Feeding of critically ill patients with a spoon and with a spout cup

• Warn the patient 15 minutes before bringing food, get his or her consent.

• Ventilate the room. Prepare a bedside table.

• Raise the head edge of the bed (put an additional pillow under the head and back).

• Help the patient to wash his or her hands.

• Cover the patient's chest with a napkin.

• Wash the hands. Bring the patient food (the temperature of hot dishes is 50 °C).

• Feed the patient slowly: call each dish offered to the patient; fill with 2/3 spoon with soft food; touch the spoon of the lower lip so that the patient opens his mouth; touch the spoon to the tongue, leaving food in the mouth; remove an empty spoon; give time to chew and to swallow the food; offer a drink after a few spoons of soft food; attach the spout to the lower lip; pour in small portions.

• Wipe (if necessary) the patient's lips with a napkin.

• Ask the patient to rinse the mouth with water from the drinker after eating.

• Remove dishes after the meal and leftovers of it from the patient's room.

• Remove the additional pillow and give the patient a comfortable position.

If possible, give the patient an individual set of dishes, which, after feeding, should be cleaned from the food residues and washed with a cleanser, then disinfected.

Tube feeding

Patients in unconscious state or for the patients with mental disorders (who refuse to take food), as well as patients with traumatic injuries of the oral cavity should be fed with a tube. The children of a deep prematurity are also fed so when they lack sucking and swallowing reflexes.

For the tube feeding, prepare a thin gastric tube without olive, a funnel with a capacity of 150–200 ml, a Janet's syringe and 1–2 glasses of liquid or semi-liquid food.

The tube, funnel and syringe must be sterilized by boiling and cooled up to the temperature of the patient's body. The tube should be inserted through the nasal passage. Before the inserted tube nasal passages should be examined, cleared of crusts and mucus; the rounded end of the tube is to be lubricated with glycerol.

When the tube reaches the posterior wall of the oropharynx, the patient (if conscious) is asked to take a swallowing movement or carefully, pushing the index finger through the patient's mouth, gently press the probe toward the back wall of the pharynx, pushing it further along the esophagus, bypassing the larynx and trachea.

When the tube hits the larynx and trachea, it usually causes wheezing stenotic respiration and coughing. In this case, the probe should be a little pulled back, then let the patient calm down and, as it just have been described, gently move the probe along the esophagus into the stomach (approximately to 35–45 cm, it depends on the patient's body height). To make sure that the probe does not hit the trachea, a piece of cotton wool or tissue paper is brought to its outer end. If cotton wool or paper does not move synchronously with the patient's breathing, the food can be inserted into the tube.

The food should be poured in the funnel in small portions or slowly, injected through the tube using a Janet's syringe stop-and-go. The food for one insertion at a time should be about 250 ml, the frequency of feeding should be equal 3–4 times a day. The liquid food inserted through the tube must be prestrained through gauze and heated to a temperature of 40 °C. During feeding, you must be ensured that the lumen of the tube is not filled, and regularly "wash" it with tea, juice or broth. After feeding, 20–40 ml of warm water is to be passed through the tube.

Hygiene of the patient's nutrition

When the patient enters the hospital, he or she should be informed about the rules for storing food. For this purpose, lists of authorized (indicating their limiting number) and forbidden for the

transfer of products are posted in the places of reception of the transfer and in the offices. These provisions are regulated in accordance with the prescribed diet and sanitary–hygienic regime of the medical institution. Food products for patients are transmitted within cellophane bags with the patient's last name, first name, patronymic and the date of transfer. Each refrigerator and bedside table in the hospital unit should be daily checked for the spoiled food according to the rules and terms of storage of the products. Food products are withdrawn and sent to waste in cases when the expiration date has passed, if stored in a refrigerator without cellophane packages and without indicating to whom the food belongs and also if there are signs of spoilage.

Control questions

1. What are the main requirements for feeding patients during postoperative period?
2. What types of food do you know?
3. What is parenteral nutrition and when it should be done?
4. What are the preparations for parenteral nutrition?
5. What kinds of surgical diets are mostly used? Describe them.
6. What kinds of food should be provided for the patients with resect stomach surgeries?
7. What kind of food should be provided for the patients with resect esophagus surgeries?
8. Describe the diet for the patients with intestine surgeries.
9. Describe the diet for patients after biliary tract surgeries.
10. Describe the diet for patients after rectum surgeries.
11. Describe the peculiarities of feeding critically ill patients.
12. What are the methods of artificial feeding postoperation patients?
13. Describe the feeding enema, which T. Billroth used in a patient after resection of stomach.
14. Nutrient enemas. Which products may be used for feeding through enema?
15. What are the rules of food storage for patients?

Control tests

1. A patient is choosing items for breakfast. Which of the following items contains the most amount of potassium?

A. Toast.
B. Melon.
C. Strawberries.
D. Eggs.

2. A patient is on a clear liquid diet. Which of the following is NOT allowed on this diet?

A. Orange juice with pulp.
B. Water.
C. Coffee.
D. Tea.

3. Elderly patients are prone to stomach-aches and bloating. Which of the following foods are avoided since they are gas-forming and contribute to the mentioned condition?

A. Prunes.
B. Colas and sodas.
C. Protein-rich foods.
D. Cauliflower.

4. A client who has not had a bowel movement during four days would receive the most benefit from which of the following procedures?

A. Endoscopy.
B. Colonoscopy.
C. Catheterization.
D. Enema.

5. The nursing assistant is helping patients to eat in the dining-room when, suddenly, a patient stands from their seat and begins clutching their throat while coughing silently. Which of the following actions does the nursing assistant perform first?

A. Begin the Heimlich maneuver.
B. Begin CPR immediately.
C. Ask the patient if they are choking.
D. Call 911.

6. A patient who has a colostomy is complaining about having excess gas. You ask the patient to tell you what he has eaten in the past 48 hours. Which food would you suspect is causing the patient excessive gas?

A. Squash, spinach, and pickles.
B. Chicken, grapes, and raspberries.
C. Caraway seeds, tomato soup, and eggs.
D. Cherries, radishes, and watermelon.

7. What type of the diet should a patient with gout follow?

A. Potassium-modified diet.
B. Low-purine diet.
C. High-calcium diet.
D. Renal diet.

8. What diet would a patient with anemia benefit from?

A. Legumes, organ meat, and dark green leafy vegetables.
B. Vegetables, fish, and pasta.
C. Grains, berries, and organic vegetables.
D. Nuts and seeds, fruits, and soy products.

9. A patient has a low magnesium level. Which food of the selection below is the highest in magnesium?

A. Liver.
B. Mushrooms.
C. Rhubarb.
D. Avocado.

10. A patient's potassium level is 6.0. Which food should the patient avoid?

A. 6.0 is a normal potassium level so the patient can eat whatever they want without an effect.
B. Egg yolks.
C. Milk.
D. Raisins.

11. A patient has a stage 4 pressure ulcer on their sacral area. What type of foods would the patient most benefit from?

A. Liver, spinach, corn.
B. Oats, fruits, and vegetables.
C. Peanuts, tomatoes, and cabbage.
D. Dried beans, eggs, meats.

12. A patient is post-opt from gallbladder surgery and is ordered a clear liquid diet. Which of the selection can the patient have?

A. Creamy chicken soup.
B. Vanilla custard.
C. Liquid dishes.
D. Apple juice.

13. A patient just had a Wound Vac ® placed on her abdomen from abdominal surgery. Which foods would help promote wound healing?

A. Liver, beef, and fish.

B. Corn, poultry, and grains.

C. Peanuts, beans, and pork.

D. Citrus fruit and tomatoes.

14. A patient is to be started on enteral feeding. What important step should the nurse take before the patient is started on enteral feeding?

A. Assess the patient allergies to lactose.

B. Make sure the patient says nothing by mouth while enteral feeding is being administered.

C. Evaluate the family's perception of the enteral feeding.

D. Assess the patient's understanding about enteral feeding.

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