Diet and quality of life for patients with large bowel excision

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Abstract

We analyzed cases with intestinal infarction operated in 1st Surgical Clinic of UMFVBT in the past 5 years (66 cases in a total of 12458 surgeries: 0,52%). In stage IV of intestinal infarction we practiced large bowel resection often preserving only 40-60 cm of small intestine. After surgery, for these patients, quality of life is deeply affected.

Results. These are patients with special needs regarding food. Balance between per os and parenteral nutrition in these patients is difficult to maintain in favour of oral feeding. The daily should be ensured by a high calorie diet, rich in fat and protein, easily metabolized and rapidly absorbed. Parenteral nutrition is easier to manage and quantify but it involves long term risks. In conclusion, orally diet is very important for these patients; they need a well-balance between solid and liquid foods. In these patients is imperative to reduce elimination of many watery stools which deprives the body of minerals and electrolytes, in addition to increasing difficulties in intestinal absorption.

Keywords: short bowel, malabsorption, nutritional deficiencies, diet.

1. Introduction

Short-bowel syndrome is a state of severe malabsorption secondary to extensive bowel resection (over 3 m). These extended intestinal resections are absolutely necessary in diseases that affect normal intestinal function and vitality as the intestino-mesenteric infarction, intestinal complicated and extensive polyposis and diverticulosis or Crohn's disease [2,3].

After large bowel resection, malabsorption syndrome becomes manifest and its severity is consistent with the size of intestinal resection, so with the secondary effects on other organs the organs. The pathophysiological consequences on the entire body are directly correlated on extent and site of resection, integrity and adaptation of the remaining bowel.

Most extensively bowel resected patients can be adequately nourished by mouth, especially since they develop compensatory hyperphagia. For patients with colon in function a high-carbohydrate low-fat diet is beneficial compared to a diet with a normal fat content, because it results in decreased diarrhoea, decreased faecal mineral and electrolyte losses, and increased energy assimilation, allowing absorption of nutrients absolutely necessary, with specific reduction of intestinal malabsorption on catabolic mechanisms.

Patients with jejunostomy have a high faecal output of water (through lack of fluid absorption during transit colon), digestion is incomplete, with rapidly losing intake of food, water, sodium and divalent cations.

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The vitality of these people with special needs is dependent on permanent parenteral supply of carbohydrates, lipids, protidic, minerals and vitamins [2].

Patients without colostomy (rectum against nature), but with internal derivation and bowel resection are easier to maintain life and activity because the psychological component of the anal sphincter preservation. When there is a possibility of a minimum 50 cm of small bowel, patient quality of life will be better if there is an adequate oral nutrition.

The colon is about 1.8-2m long. Major feature of the colon is to absorb water and salts from digested food entering in the proximal areas of the digestive tract (stomach, small intestine). Approximately 2/4 of materials entering the small intestine into the colon each day are liquids. These materials can remain there for several days until most of the fluids and salts are absorbed into the body. The fecals then pass bowel contractions after its more up when it reaches the left of where it is stored up until it triggers contractions related to defecation act [1].

2. Materials and methods

We analyzed cases with intestinal infarction operated in 1st Surgical Clinic of UMFVBT in the past 5 years (66 cases in a total of 12458 surgeries: 0,52%). In stage IV of intestinal infarction we practiced large bowel resection often preserving only 40-60 cm of small intestine. After surgery, for these patients, quality of life is deeply affected. Postoperative mortality in these situations is very high, reaching 30%. Patients that we study were follow-up in evolution monitoring directly or through a preformed questionnaire. It is absolutely necessary to follow up these patients with special needs. Avoidance of postoperative waiting for various reasons and waiting that malabsorption was more difficult and often impossible. The immediate consequence was that patients with short bowel, under 50 cm, the survival was limited to a maximum of three years with all interdisciplinary effort. Analyzing these cases that were lost in the first three years we found that death wasn’t caused direct by malabsorption, but failure of other organs and associated pathology with deficiencies inherent lack decompensated bowel, deficiencies manifested more quickly and insidiously at the elderly.

In patients with limited bowel resection we noticed that after a period of 6 to 12 months about adjusting the body, it was necessary a high calorie diet and a regular fluid balance, body began to function almost normally. After this period the number of the liquid stools decreases, consistency of faeces returned to normal, creating the premises of good life and activities.

Nutrition and hygiene are basic conditions for a body to be healthy. A balanced diet should provide all macronutrients and micronutrients reported to the needs of each patient. Ensuring adequate nutritional support in critical patients can reduce morbidity and mortality through replacement energy and tissue losses done by a increased catabolism [4].

Remaining bowel begins to adapt to new conditions shortly after surgery. Full resumption of functions to its, the patients can have unpleasant events, manifesting actually like adverse events or clinical expression of pathological conditions. In this category there are excessive flatulence, sensation of bloating or cramps transient seats, diarrheal fluid loss and weight reduction.

Permanent symptoms fit this pathology in short bowel syndrome. In the immediate postoperative period, with the resumption of bowel and food tolerance the patients are educated to influence the evolution of the disease, to help the intestine to adapt, using an appropriate diet. They imagined diets and guides for patients with short bowel [5].

Nutritional requirements are calculated according to the rest of the body’s energy needs, the surplus energy consumption during convalescence and the preexisting nutritional status of the patient.
Formula: calorie needs: 25 kcal / kgbody x correction factor (stress index) [1,2,4].

It provides the carbohydrates and fat as energy substrate (1), lipids may constitute 30-50% of intake, according to pathological disorders.

Daily protein requirement is 0.8 to 1.5 g / dl in most patients (less to those with renal and hepatic failure and more in case of loss by plasmoragie, proteinuria etc.). Nutrient intake consists of macronutrients and micronutrients.

### Table 1. Macronutrients [4]

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrates</td>
<td>&gt; 5 g/kg body/day</td>
</tr>
<tr>
<td>Fats</td>
<td>1-1.5 g/kg body/day</td>
</tr>
<tr>
<td>Protein</td>
<td>0.8-1.5 g/dl</td>
</tr>
<tr>
<td>Water</td>
<td>30-40 ml/kg body</td>
</tr>
<tr>
<td>P</td>
<td>1000 mg</td>
</tr>
<tr>
<td>Na+</td>
<td>90-150 mEq</td>
</tr>
<tr>
<td>Mg++</td>
<td>350 mg</td>
</tr>
<tr>
<td>K+</td>
<td>60-90 mEq</td>
</tr>
</tbody>
</table>

Water is the vehicle used in enteral nutrition food and it must be taken considering the water balance. [6]

**Micronutrients:** vitamins and trace elements are Mg, Zn, Co, I, F, Mb, Se, Cu, Mn. Vitamins and trace elements are present in the nutritional composition of pharmaceutical products. Nutritional status of these patients is assessed by criteria: [4]

1. **Clinical criteria:**
   - reported in the patient's ideal weight and body mass index
   - subcutaneous fat fold
   - arm circumference

2. **Biological criteria:**
   - total blood protein: 5.6-8.4 g/dl
   - albuminemia: 42 ± 2g / l (8)
   - prealbumina (transretina TTR) 310±35 mg/l
   - transferinemia 2.8 ± 0.3 g / l (8)
   - RBP retinol binding protein 62 ± 7 mg/l

**Enteral nutrition.** The name of enteral nutrition comes from Greek: enteron = bowels, so enteral nutrition is representing any form of food using the gastrointestinal tract. Enteral nutrition is indicated and effective when the digestive system structure and function are normal.

There are situations, usually temporary when enteral feeding is contraindicated:
- recent interventions by the digestive tract
- massive gastrointestinal bleeding
- in the absence of bowe movements.

Direct enteral feeding is done by:
- gastric tube: nasogastric, orogastric
- naso-duodenal probe
- nasojejunal tube (placed intraoperatively)
- jejunostoma surgery
- esofagostoma
- surgical gastrostomy P.E.G. (Percutaneous endoscopic gastrostomy)

By this method of feeding (enteral) may be given two categories of products:
- pharmaceuticals officinal (by kitchen)

Pharmaceutical products used for enteral nutrition typically consist of polymer formulas with synthetic chemicals designed for this purpose and administered by gastric tube, duodenal or jejunal. They have osmolarity around 300 mOsm / l, containing 1 or 1.5 kcal / ml and 5-7-9 g N to 1000ml. Examples: Fresubin®, Ensure®, Survimed®, etc. Pulmocare®. These products contain all necessary nutrients namely: proteins, carbohydrates, fats, fibers and also electrolytes, vitamins and trace elements.

There are also natural products, prepared and administered in adequate doses, provide the necessary of nutrients and curative properties, beneficial in these patients. One such natural product, no expensive is alfalfa, Medicado sativa (Lat.), it is used by folk medicine for a long time for its medicinal properties. It has unique curative and invigorating properties. Scientific studies certify that both alfalfa leaves and other parts of the plant that grow above ground, containing a large amount of beta-carotene, vitamin B, C, D, E, K and minerals such as potassium, iron, calcium and phosphorus. Chlorophyll content gives its detoxifies quality. It has shown that alfalfa can be successfully managed acute and chronic digestive disorders. Its effects are done by content of vitamin U and combat bloating, ulcerative lesions and prevents loss of appetite, so it is indicated also in intestinal adaptation, with raw cabbage juice. Magnesium content of modern preparations intensify this effect.
Alfalfa contains substances having antimycotic, growth and intestinal passage actions. It facilitates absorption and assimilation of carbohydrates, protein, calcium, iron and other trace elements. It strengthens the immune system and slows the degradation processes. Increase physical strength and stamina and also ensure a restful sleep. Biologist Frank Bouer called alfalfa "the great cure" because, according to his research, it contains eight essential enzymes, besides these, there are each alfalfa 100g of 8000U of vitamin A and 20000-80000U of vitamin K. Officinal products (by kitchen) used in enteral nutrition foods are the ground and dissolved or suspended in water, to be administered by a relatively thin tube with a diameter of 2-3 mm. These may be:
- protein: milk, egg white, ground meat, peas
- fats: olive oils, soybean, sunflower, corn, egg
- carbohydrates: starch, sucrose, lactose, fructose

**Fortified Milk Recipe:** ½ L milk 2% low fat; ½ L milk 1% low fat, skim, or Lactaid milk; 1/3 cup of instant powdered milk (usually one envelope). Blend the above ingredients well. Keep refrigerated. *Nutritional value for every 8 oz serving:* If mixed with: whole milk 230 calories, 16 grams (g) of protein; 2% milk 200 calories, 16 g of protein; 1% milk 180 calories, 16 g of protein; skim milk 160 calories, 16 g of protein

**Monitoring enteral nutrition**

*I. The clinical parameters:*
1. Inspection of administration before each time, namely:
   - probe position
   - permeability probe
2. Inspection amount of residual stomach before each meal in bolus food and at 6 hours for continuous feeding.
3. Inspection food quality to be taken regarding:
   - validity period for pharmaceuticals
   - appearance and smell the products officinal (cooked)
4. Inspection amount and rate of compliance reported by the physician managing the patient's diet sheet.
5. Announcement of any signs of digestive intolerance: nausea and/or vomiting, flatulence, abdominal pain with or without muscular defense, diarrhea, hiccups, heartburn
6. It notes if allergic manifestations occur.

*II. The lab tests parameters:* Serum albumin has a half-life of 20 days and it is less effective in monitoring nutrition. Prealbumina or transtiretina (TTR) is most suitable for assessing protein nutritional support, in this more important then its absolute values are variations in time. It is recommended to determine at regular intervals (3 days) [8,9]. Glucose will be monitored daily or several times a day in diabetics. Ionograma serum: Na, K, Ca, Mg and phosphate are the parameters whose prosecution is necessary and useful. Urinary urea, nitrogen balance that serves to adapt to the caloric and protein intake [4].

Dietary Guidelines recommended to patients with short bowel:

1. *To eat small amounts, frequent meals (six to eight small meals a day).* This indication has like physiological substrate less stress on the shortened bowel, with faster elimination of food and overloading bowels with intestinal absorption deficit. Small meals help control your symptoms, and will result in better digestion and absorption. Once the bowel has adapted, the patient can resume having three meals a day.
2. *The patient must eat slowly and chew the food well.*
3. *Limit fluid intake during your meals.* It is best to drink beverages at separate times from the solid foods. Fluids taken with meals push food through the bowel at a faster rate. This may result in inadequate digestion and absorption of nutrients. The patient can slow down this process by drinking fluids between meals, at least one hour before or after a meal.
4. *It is recommended to include the following nutrients in the meals with high doses of proteins:* fish, poultry, meat, eggs, tofu, dairy products, smooth peanut butter, high in refined or low-fiber complex carbohydrates (white bread, cereals, corn flakes, potatoes without skin, white rice, pasta).
5. **Moderate consumption in fat.** Fat consumption is individualized and based on the gut preserved. Those, the patients who suffer a large section of ileum removed, may tolerate larger amounts of fat at breakfast time better than later in the day: oils, butter, margarine, mayonnaise, sauces.

6. **Low in concentrated sweets:** sugar (cookies, cakes, candies, chocolate, soda, instant teas, fruit drinks), corn syrup, molasses, honey, pancake syrup.

7. **Include beverages in your diet.** Drink enough fluids to prevent dehydration: try to drink at least eight full glasses of fluids each day. Avoid very hot or cold drinks. It may be better to stick with drinks that do not have a high sugar content. Plain drinks include water, coffee, tea, milk, or juices diluted with water.

8. **The patients with lactose intolerant have to follow a low-lactose diet:** lactose is milk sugar. Lactose can cause gas, cramps, and diarrhea in some people. These symptoms usually begin within the first half hour of taking a dairy product. Start with ½ cup of milk. If the patients have any symptoms, they have to try lactose-free dairy products, such as Lactaid® milk, also they can use Lactaid tablets or Lactaid drops to help their digest dairy foods. Some dairy items have high amounts of lactose. Others have less. Start with cultured yogurt and aged cheeses (e.g., hard cheeses such as cheddar and Swiss). If you the patients can eat those, they can try soft cheeses (e.g., cream cheese and cottage cheese). If symptoms still occur with these items, they may wish to avoid milk and milk products for a month or two and then retry them. Sometimes lactose intolerance is temporary.

9. **Follow a low-oxalate diet.** Patients who have had their ileum removed and have an intact colon may need a low oxalate diet. The ileum is the last section of the small intestine. This diet prevents kidney stones from forming. Foods that are high in oxalates are: tea, coffee, cola drinks, chocolate, nuts, soy products, green leafy vegetables, sweet potatoes, celery, berries, tangerines.

10. **Diet with low-fiber.** It is important to note that because it is recommended a rich diet in fibers in intestinal diseases. Contrary, these patients suffer from "lack of gut" and therefore they avoided high content of fiber fruits, vegetables and cereals listed below. A high fiber diet helps promote regular bowel movements and is part of a healthy diet. In these patients high fiber diet creates discomfort. Low-fiber diet prevents this. Creating a bowl excremental by absorbing liquids can be achieved in the absence of fibers and therefore recommend maintaining fiber intake to less than 15 grams per day. We recommend checking food labels to avoid those products containing more than 2 grams of fiber per serving. Low-fiber foods to include in your diet and high-fiber foods to avoid are listed below:

<table>
<thead>
<tr>
<th>Include these low-fiber foods</th>
<th>Avoid these high-fiber foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canned fruit</td>
<td>Fruit and vegetable skins, peels, membranes, and seeds</td>
</tr>
<tr>
<td>Fresh fruit without skins, peels, membranes, or seeds</td>
<td>Coconut</td>
</tr>
<tr>
<td>Fruit and vegetable juices without pulp</td>
<td>Dried fruit</td>
</tr>
<tr>
<td>Cream of wheat, farina puffed wheat</td>
<td>Nuts, sunflower or other seeds</td>
</tr>
<tr>
<td>Oatmeal or toasted oat cereal</td>
<td>Whole grain breads, cereals, and baked goods</td>
</tr>
<tr>
<td>White rice</td>
<td>Brown rice</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Well-tolerated vegetables</th>
<th>May cause gas or discomfort</th>
</tr>
</thead>
<tbody>
<tr>
<td>carrots</td>
<td>onions</td>
</tr>
<tr>
<td>Green beans</td>
<td>cauliflower</td>
</tr>
<tr>
<td>spinach</td>
<td>broccoli</td>
</tr>
<tr>
<td>beets</td>
<td>cabbage</td>
</tr>
<tr>
<td>Potatoes without peel</td>
<td>Brussels sprouts</td>
</tr>
<tr>
<td>Asparagus and lettuce</td>
<td>Legumes such as lentils, chick peas, lima beans</td>
</tr>
<tr>
<td>Cucumber without skin or seeds</td>
<td>corn</td>
</tr>
<tr>
<td>Tomatoes without peel or seeds</td>
<td>peas</td>
</tr>
</tbody>
</table>

11. **Vitamin and mineral supplements.** It may be a good idea to take one multivitamin each day. It should have the recommended daily allowance (RDA) for vitamins and minerals. *Vitamins A, D, and E.* The patients need water-soluble forms of vitamins A, D, and E. This is rare and happens only if a large portion of the ileum has been removed (the place where the absorption is dueing). If the last part of your ileum has been removed, you will require injections of B₁₂ every one to three months.
The patients may need extra calcium when the ileum has been removed and the majority of the colon is left intact. If you have frequent diarrhea, your potassium levels may decrease, so the lost can be recovered by eating foods that are high in potassium or taking potassium supplements. Blood potassium levels should be monitored in patients with frequent diarrhea.

12. Foods rich in potassium are oranges, potatoes, tomatoes, bananas. Zinc supplement is recommended in patients with diarrhea himself.

13. Oral rehydration solution. If the patients are having a lot of diarrhea, it is recommend the oral rehydration solution.

14. Nutritional supplements. If the patient is losing weight, a high-calorie supplement drink may be helpful. However, depending on the extent of the surgery. This is because they have high sugar content. Another option can be products of milk.

3. Results and discussion

There are patients with special needs regarding food. Balance between per os and parenteral nutrition in these patients is difficult to maintain in favour of oral feeding. The daily should be ensured by a high calorie diet, rich in fat and protein, easily metabolized and rapidly absorbed. Parenteral nutrition is easier to manage and quantify but it involves long term risks. Patients analyzed diet label was made at a rate of 69%, and the evolution and prognosis was favorable in 46% of patients interviewed. There is not a standard treatment for irritable bowel syndrome. It can be used fiber supplements. Antispasmodic medicines and some anxiolytics may improve the health of these people with special needs. Antidepressants may be used in patients who also shows signs of depression. Major concern regarding drug therapy is that there is a danger of addiction medicine that can affect quality of life [1].

Our observations show that yogurt is a food well tolerated. Its effects are beneficial bacteria content or replace lactase, an enzyme found in dairy products. Dietary fiber can improve too the short bowel symptoms in many cases (44%).

Bread and cereals, fruits, beans and vegetables are an excellent source of fiber.

A rich diet in fiber maintains bowel moderately relaxed, which help to prevent cramps during peristaltic waves.

Daily intake of soluble fibers maintain an optimum content of liquid fecal bowl, thus preventing constipation or difficult progression of faecales during intestinal passage. Very high fiber diet can cause bloating and gas initially generally disappear a few weeks after surgery when the intestine was completely adapted. Meals in large amounts can cause cramps and diarrhea on these patients. The symptoms can be controlled through quantitatively reduced meals or eating less and often. These recommendations should be respected especially for foods with a low-fat and high in carbohydrates such as pasta, rice, bread and cereals, fruits and vegetables. [1,10,11]

4. Conclusion

1. Orally diet is very important to these patients; therefore it needs to be calculated individually necessary for solid foods and liquids in order to reduce diarrheal seats that polish the body of minerals and electrolytes, and preventing proper absorption of food.

2. A food diary is helpful for following information:
[5]
- The time of ate the meal
- The name of the food item or beverage.
- The amount of the food you ate or the beverage you drank.
- Any symptoms you had.
- If you have an ileostomy or colostomy, it is also helpful to record your fluid output. Measure the amount of stool in your bag for one week. Measure it each time you change or empty the bag. Then, if it is about the same each day, measure it once a month for a day or two.

3. These patients should be monitored regarding their nutritional status and when appear malabsorption phenomenas (weight loss, metabolic disorders and fluid and electrolyte loss) is absolutely necessary to supplement oral nutrition with parenteral nutrition, weekly or monthly.
References


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