

Review

The Dietotherapy of Malignant Degeneration of Small Intestine and Colon, Correlated with the Anticancerous Therapy

T. Mogoș, Andra Evelin Iacobini

"N. Paulescu" Institute of Diabetes & Metabolic Diseases, Bucharest, Romania

REZUMAT

Dietoterapia degenerării maligne a intestinului subțire și colonului corelate cu terapia anticancerasă

Terapia complexă a neoplasmului de colon tub digestiv, localizat în articolul de față la nivelul intestinului subțire și colonului, implică măsuri terapeutice specifice. Ele sunt necesare pentru a crește rezistența organismului la agresiunea malignă și de a face față incisivității intercurențelor ce pot apărea pe fondul kariokinetic diminuat ca apărare. Terapia nutrițională pregătește pe de o parte starea de rezistență a pacientului înainte de instituirea terapiei oncologice, iar ulterior caută să-i mențină cât mai mult timp balanța nutritivo-energetică, când mijloacele oncologice sunt deja utilizate (chimioterapie, radioterapie, rezecții chirurgicale).

Cuvinte cheie: cancer, intestin subțire, colon

ABSTRACT

The complex treatment of cancer located in the digestive area (in this article, there are presented the small intestine and colon) involves specific therapeutic measures. These must be taken in order to increase the resistance of the organism to the malign injury and to face the incisivity of different factors which can influence the body in the context of malignancy (the resistance in different parts of the organism decreases). The nutritional therapy prepares on one hand the body's resistance before starting oncologic treatment, and, on the other hand, maintains the necessity of a nutrition able to prolong the patient's survival and its quality.

Key words: cancer, small intestine, colon

Small Intestine Cancer

The presence of primary or metastatic cancer in

small intestine has as a first line treatment the segmental resection. We reach the same therapeutic conduct in case of cancerous patients exposed to

Corresponding author: Dr. Tiberius Mogoș, Doctor in Medicine
chief physician in Diabetes, Nutrition and Metabolic Diseases, specialist physician in Internal Medicine,
at "N. Paulescu" Institute of Diabetes & Metabolic Diseases, Bucharest, Romania
e-mail: tibimogos@yahoo.com

abdominal radiation therapy, sometimes severely affecting the small intestine (perforations, strictures, hemorrhages, fistulae). The nutritional implications of intestinal resection are significant, given the role of small intestine in digestion and absorption of nutritious principles, and the maintenance of enterohepatic circulation of biliary salts [1].

When we resort to ileal resection, if it does not exceed 100 cm, then a considerable part of biliary salts can not enter the reversed hepatic circuit (the surface for intestinal absorption diminishes) and they enter the colon, where they induce a watery diarrhea. It can be avoided if the patient is administered cholestyramine (it binds biliary salts, making them unable to induce diarrhea). Dietary measures alone are not sufficient. We start with 4 grams of cholestyramine per day, dosage after which the diarrhea stops abruptly. Afterwards, the dosage is decreased to half or less. In the mentioned conditions, though a part of the biliary salts lose their capacity to emulsify fats, the absorption of fats is not considerably disturbed [2].

In return, if the ileal resection is larger than 100 cm, then a significant quantity of biliary salts enter the colon and a very small part remains available for intestinal reabsorption. Given these circumstances, the liver tries to counterbalance the biliary loss through a maximum synthesis which proves to be insufficient for providing an efficient lipidic absorption [3].

From dietotherapeutic point of view, the improvement of fats' absorption can be induced through the decrease of long-chain triglycerides intake and the increase of medium-chain triglycerides (they do not need biliary salts in order to be absorbed; they absorb 4 times more than the long-chained ones). At the same time, we must administer a sufficient intake of polyunsaturated

fats (unprovided by the medium-chain triglycerides) in order to insure the required essential fatty acids [4].

We also resort to both liposoluble vitamin supplements and increased intake of calcium, magnesium and zinc (ileal resection favours the body's depletion in these minerals). Another consequence of ileal resection is hyperoxaluria (favours the formation of oxalate renal lithiasis) [5]. The phenomenon is due to the decrease of oxalate ion precipitation by the intestinal calcium, as the last is coupled with the unabsorbed remaining fatty acids in large quantities in the remaining small intestine and colon. As a consequence, the oxalate, nonexistent in an insoluble form, is absorbed in the intestine and subsequently excreted through the urinary tract. At this level, found in high concentrations, it can precipitate and form oxalate lithiasis. In order to minimize the risk of oxalate lithogenesis, it is recommended the decrease of long-chain triglycerides intake and the increase of the ones with medium-chain (this way, we diminish the disponibility of remaining unabsorbed fatty acids to couple with intestinal calcium). At the same time, the consumption of products rich in oxalic acid is reduced (see **table 1**), as we predominantly resort to the ones with low or no contents in oxalic acid (see **table 2**). We also administer at least 1 g of calcium per day with the purpose of precipitating the intestinal oxalate [6, 7].

Both through diet and pharmacotherapy, we increase the magnesium intake, so that its plasmatic concentration reaches the normal range, and its daily urinary excretion exceeds 6 mEq per day. This quantity of magnesium is needed to render soluble the calcium from the tubular urine, thereby blocking the oxalo-calcic lithogenesis [8].

We mention that over a certain level, the increase

Table 1. Foods with high content in oxalic acid (examples)

Vegetables	Fruits	Drinks	Various foods
beet root	blueberries	Tuborg beer	chocolate
celery	dried figs	tea	cocoa
dandelion	blackberries		wheat buds
eggplant	raisins		earth nuts
leek	gooseberries		
parsley	lemon peeling		
sweet potato	raspberries		
spinach			
tomato concentrate			

Table 2. Foods with low or absent content in oxalic acid (exemples)

Vegetables	Fruits	Drinks	Various foods
broccoli	avocado	apple juice	butter
brussels sprouts	bananas	beer	cheese
cabbage	sour cherries	cider	eggs
cauliflower	grapes	coca-cola	fish (sardines excepted)
cucumbers	mango	grapefruit juice	lemon juice
lettuce	melons	lemonade	macaroni
mushrooms	nectarines	milk	margarine
onion	peaches	orange juice	meat
peas	pineapple	pepsi-cola	chicken
rice	plums	pineapple juice	skimmed milk
chive		wine	yoghurt
radishes			
turnip-cabbage			

of oral magnesium intake favours the occurrence or emphasis of diarrhea. Due to these reasons, we limit its oral intake to the maximum allowable level and we restrict the consumption of fats in order to diminish the stool excretion of magnesium. The recurrent parenteral administration of magnesium supplies this mineral's needs. The alimentary intake of vitamin C must not exceed 0.5 g per day, so it does not favour oxalogenesis (the ascorbic acid is precursor for oxalogenesis) [2, 9].

We also must limit the sodium intake, as the salt restriction is followed by the decrease of calciuria [10].

Colon Cancer

The first choice therapy for colon cancer is the surgical one. If the clinic form of the tumour does not represent a far-gone stage, we perform a wide resection with the removal of regional lymphatic nodes. Between the remaining intestinal segments we create anastomosis provided that the rectoanal area is not affected. If the rectum is affected in a malignant way, we perform a colostomy [11].

We also resort to colostomy when we desire to palliatively solve occlusions induced by inoperable tumours. Colostomies can also have a temporary character, being used as a first surgical step for malignant tumours complicated with occlusion or perforation [6, 12].

Colostomies can be placed anywhere on the colic frame, even on the caecum [12].

When there is a diffuse rectocolic polyposis accompanied by malignant transformation, the

resection of the whole colonic frame and rectum are necessary, allowing the evacuation of intestinal content through an ileostomy [13].

The nutritional adjustment to the conditions created through the anastomosis of remaining intestinal segments is, generally speaking, relatively good, though an adaptation period of a few weeks is required [14].

The particular nutritional problems are raised by ileostomies and colostomies [4].

In the case of ileostomy, we must take into account the fact that the absorbing function of the colon is suspended. For the stated reasons, shortly after the surgery, the digestive losses of water raise to 1000 – 2000 ml per day. At the same time, there are involved to the exterior large amounts of sodium (60 – 100 mEq per day) and lower amounts of potassium (7 – 12 mEq per day). In the course of time, adaptive reactions occur, which limit water elimination to 500 – 700 ml per day. These hydroelectrolytic losses must be replaced through a proper enteral intake. It is very important for patients with ileostomy to understand that the decrease of water intake does not significantly diminish the liquids eliminated through the ileostomy, inducing on the other hand the dehydration of the organism. The last is all the more marked if, on condition of limiting the intake of liquids, the patients become feverish or present vomit. If the patients are chronically dehydrated, the urine output decreases and the occurrence of urinary lithiasis increases. If the potassium losses are not high, the minor deficits can be removed through the consumption of orange or grapefruit juice or milk [4].

Frequently, there is a need to increase the

parenteral intake of vitamin B12 (in the case of distal ileal resections). This is cautiously performed, as vitamin B12 stimulates mitogenesis, in large amounts being able to worsen the tumoral multiplication [15].

If the patients also presents at the same time a few resected ileal segments, there is a need for liposoluble vitamin supplement for the diet [13].

We must draw attention to the patient that a high intake of sodium (over 200 mEq per day) is not recommended because the individual can not resorb the excess of sodium, which induces a watery diarrhea with extra dehydration [4].

We specify that through ileostomic liquid losses, many patients constantly present a certain degree of dehydration, subjectively manifested through thirst and hyperconcentrated urine [16].

Right following surgery, the diet acquires a liquid character and shortly after it composes of foods with small content of alimentary fibers (see **table 3**). Progressively, we introduce a wider range of foods which comes closer to a nonrestrictive diet [17].

In **table 4**, we reproduce a few dietary

recommendations to be able to overcome a part of the unpleasant occurrences concerning the presence of ileostomy [2, 9, 12, 15].

We mention that the diet must be adjusted according to the individual particularities of the patient. Attaining a normal diet is generally reached 2 – 3 weeks later. In the case of colostomies, the feeding conduct is mostly influenced by the level at which the stoma was performed on the large intestine. From this point of view, we will take into account the fact that at the caecum level, the intestinal content is fluid, in the ascending colon it is semifluid, in the transverse colon soft, in the splenic flexure semisolid, in the descending colon solid, and in the rectum very solid [12].

Thus, performing a caecostomy or a colostomy on the ascending colon involves taking dietary measures resembling to those recommended in the case of ileostomy. The single difference resides in the fact that the aperture of the stoma in the colon is larger and has a lower risk of obstruction, therefore the feeding preventive measures concerning its blockage have a

Table 3. Nutritive products with low content of alimentary fibers

Type of food	Permitted foods	Prohibited foods
Milk	Whole milk, skimmed milk (the milk is administered only if the digestive tolerance of the patient allows it)	
Other drinks	Coffee, tea, carbonated drinks, apple, peach, pear or apricot nectar, filtered fruit juice	Alcohol, unfiltered fruit juice, plum juice
Soups	Filtered soups, permitted soups cooked from permitted ingredients	
Meat, chicken, fish	Tender veal, pork, lamb, chicken, turkey, thin fish (the meat can be consumed boiled or roasted)	Tough fibrous meat, with cartilages
Cheese	Permitted	
Eggs	Permitted	
Vegetables	Peeled potatoes (boiled, puree, baked), asparagus (cooked), beet root, cauliflower, cucumber, turnip-rooted cabbage	Unpeeled potatoes, beans, broccoli, brussels sprouts, cabbage, carrots, maize, peas, olives
Cereals and derived products	White bread, fresh or toast, rolls (without seeds), rice, flour, macaroni, noodles, spaghetti	Whole wheat, crispy biscuits, graham bread, hard muffins, whole cereals, cornflakes; other cereals apart from the permitted ones
Fruits	Cooked, canned, baked or sweetened, without peel and seeds; peaches, apricots, pears, cherries	Fresh fruits, fruits with seeds and peel, grapes, plums, fruit cocktail, pineapple, straw-berries, apples, bananas, nuts
Fats	Butter, margarine, vegetal oils, cream	
Desserts	Flavoured jelly, simple pudding, spongecake with fruit juice, sorbet	Flans, pies, pastry products with nuts, grapes, seeds, coconuts

Table 4. Recommendations concerning feeding in patients with ileostomy [4]

1. Increase of food diversity is done progressively, introducing one type of food at a time, so that we can identify the incriminated aliment in case of occurrence of pathological intestinal alterations.
2. In order to prevent the obstruction of the stoma:
 - Increase of liquid intake
 - Use of plum and grape juice in order to increase the liquid character of the intestinal content discharged through ileostomy (so we prevent the obstruction of the stoma)
 - Avoidance of foods rich in vegetal fibers, with seeds or pips
 - Long chewing of foods, provided that the dentition is good
 - Cautious introduction of foods that can create problems :
 - Celery
 - Lettuce
 - Peas
 - Mushrooms
 - Nuts
 - Coconuts
 - Tomatoes
 - Pineapple
 - Fresh fruits
 - Fruits with seeds
 - Peanuts
 - Tough meat
 - Some Chinese vegetables
3. In order to prevent the exaggerated discharges of intestinal content through the ileostomy, we prudently introduce foods which may cause problems :
 - Apple juice
 - Plum juice
 - Milk
 - Cooked beans
 - Cabbage
 - Broccoli
 - Spinach
 - Very spiced foods
 - Fresh fruits
4. When a type of food creates problems, it must be eliminated for a period of time and then retried. In the course of time different stages of alimentary tolerance can settle.
5. In order to avoid flatulence and unpleasant smells:
 - The elimination of foods that can generate flatulence and unpleasant smells (possibly retried later on)
 - Asparagus
 - Dried peas and beans
 - Beer
 - Mustard
 - Cruciferous vegetables
 - Spicy foods
 - Fish
 - Onion
 - Carbonated drinks
 - Melons
 - Eggs
 - Cucumbers
 - Fat foods like pastry products and long fried foods
 - Smelly cheese
 - The avoidance of chewing gum
 - Do not use straws to drink liquids (we swallow a lot of air at the same time)
 - Chewing foods with closed mouth
 - The consumption of regular meals
 - Addition of yoghurt and cranberry juice

Table 5. Recommendations concerning feeding in patients with colostomy [16]

1. The prevention of flatulence and unpleasant smells :
 - The elimination of foods that can induce flatulence and unpleasant smells :
 - Dried peas and beans
 - Asparagus
 - Beer
 - Mustard
 - Cruciferous vegetables
 - Spicy foods
 - Fish
 - Onion
 - Carbonated drinks
 - Melons
 - Eggs
 - Cucumbers
 - Fat foods like pastry products and long fried foods
 - Smelly cheese
 - The avoidance of chewing gum
 - Do not use straws to drink liquids (we swallow a lot of air at the same time)
2. The prevention and treatment of constipation :
 - Increase of liquid intake, especially fruit juices, the use of at least 1.5 – 2 liters per day
 - Increase of fruit and vegetable consumption
 - Addition of soft plums, figs and raisins
 - Use of whole flour and bran
3. The prevention of diarrhea :
 - Do not use chocolate, fresh pineapple, figs, peaches, spinach, tomatoes, beans, plums, apple juice, raw fruits, and milk
 - Use of boiled rice, filtered bananas, tapioca, peanut butter and potatoes
 - In case of need, we resort to a diet poor in vegetal fibers

corresponding reduced role [14, 15].

Performing colostomies on the descending or sigmoid colon require a hydric diet immediately after surgery. The progress towards a normal feeding is done earlier than in patients with ileostomy. This fact is due to the maintainance of a large portion of the colon, which can fulfil its functions [17]. However, in the case of left colostomies, diarrhea, constipation, flatulence and unpleasant smells can occur, requiring adequate dietotherapeutic measures (see **table 5**) [13].

The feeding performed for colostomies on transverse colon has an intermediate character, between the one recommended in ileostomies and left colostomies. We will take into account the fact that pasty stools eliminated at this level loose about 300 – 500 ml of water and 25 – 50 mEq of sodium per day.

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