

NUTRITIONAL CARE IN PEPTIC ULCER

Cuidados nutricionais na úlcera péptica

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ABSTRACT - Introduction: Peptic ulcer is a lesion of the mucosal lining of the upper gastrointestinal tract characterized by an imbalance between aggressive and protective factors of the mucosa, having *H. pylori* as the main etiologic factor. Dietotherapy is important in the prevention and treatment of this disease. **Aim:** To update nutritional therapy in adults' peptic ulcer. **Methods:** Exploratory review without restrictions with primary sources indexed in Scielo, PubMed, Medline, ISI, and Scopus databases. **Results:** Dietotherapy, as well as caloric distribution, should be adjusted to the patient's needs aiming to normalize the nutritional status and promote healing. Recommended nutrients can be different in the acute phase and in the recovery phase, and there is a greater need of protein and some micronutrients, such as vitamin A, zinc, selenium, and vitamin C in the recovery phase. In addition, some studies have shown that vitamin C has a beneficial effect in eradication of *H. pylori*. Fibers and probiotics also play an important role in the treatment of peptic ulcer, because they reduce the side effects of antibiotics and help reduce treatment time. **Conclusion:** A balanced diet is vital in the treatment of peptic ulcer, once food can prevent, treat or even alleviate the symptoms involving this pathology. However, there are few papers that innovate dietotherapy; so additional studies addressing more specifically the dietotherapy for treatment of peptic ulcer are necessary.

HEADINGS - Nutrition. Dietotherapy. *Helicobacter pylori*. Nutritional therapy, treatment.

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RESUMO - Introdução: A úlcera péptica é uma lesão que ocorre na mucosa do trato gastrointestinal, sendo caracterizada por um desequilíbrio entre fatores agressores e protetores da mucosa gástrica, tendo como principal fator etiológico o *H. pylori*. A dietoterapia é fundamental na prevenção e tratamento dessa patologia. **Objetivo:** Rever a terapia nutricional na úlcera péptica em adultos. **Métodos:** A metodologia utilizada foi um estudo exploratório de revisão do conhecimento disponível na literatura científica. **Resultados:** A dietoterapia bem como a distribuição calórica deve ser ajustada às necessidades do paciente com objetivo de normalizar o estado nutricional e promover a cicatrização. As recomendações de nutrientes podem ser diferenciadas nas fases aguda e de recuperação, havendo uma maior necessidade proteica e de alguns micronutrientes como vitamina A, zinco, selênio e vitamina C na fase de recuperação. Além disso, alguns estudos evidenciam que a vitamina C tem efeito benéfico na erradicação do *H. pylori*. As fibras e probióticos também possuem um importante papel no tratamento da úlcera péptica, reduzindo os efeitos colaterais dos antibióticos e auxiliando na redução do tempo de tratamento. **Conclusão:** Percebe-se que poucos são os trabalhos que evidenciam a terapia nutricional da úlcera e não há consenso sobre o tema. Com isso, mais estudos são necessários para abordar com maior especificidade o tratamento dietoterápico da úlcera péptica. Dieta equilibrada é fundamental no tratamento da úlcera péptica, uma vez que o alimento pode prevenir, tratar ou mesmo aliviar os sintomas que envolvem esta doença. No entanto, existem poucos trabalhos que inovam dietoterapia; assim, são necessários estudos adicionais abordando mais especificamente a dietoterapia para o tratamento de úlcera péptica.

INTRODUCTION

Peptic ulcer is a disease of chronic development, characterized by an imbalance between the factors that damages the mucosa and those for its protection, resulting in a lesion of the lining of the upper digestive tract²². It has been one of the most prevalent diseases in the world, and some of its complications have been the major causes of morbidity and mortality³⁴. The prevalence differs in the world population between the duodenal and gastric ulcers, and the mean age of people with the disease is between 30 and 60 years, but it can happen in any age. Racial difference has also been observed, and in Africa duodenal ulcers are found to be rare in black people, but in the United States the incidence is the same for blacks and whites; regarding gender, there is predominance of ulcers in males¹⁶.

Peptic ulcer has a multifactor etiology. Environmental elements such as alcohol and nicotine can inhibit or reduce secretion of mucus and bicarbonate, increasing acid secretion. Genetic factors can influence, and children of parents with duodenal ulcer are three times more likely to have ulcer than the population¹⁴. In the past decades, the identification of *Helicobacter pylori* and ulcers associated with the chronic use of anti-inflammatory drugs contributed to a better understanding of the events associated to the genesis of peptic ulcers³⁶.

Nutrition and its recommendations define aspects of a healthy diet, and the

need to establish nutritional benchmarks is long recognized as a way to promote health and prevent and treat diseases. Accordingly, dietotherapy has played a key role in the prevention and treatment of Peptic ulcer, with the main purpose of recovering and protecting the gastrointestinal lining, improving digestion, relieving pain, and contributing to a satisfactory nutritional status²⁹.

Peptic ulcer is a disease known since antiquity, but there are few studies innovating dietotherapy as treatment for this disease. For this reason, the objective of this study was to review nutritional therapy of peptic ulcers in adults.

METHOD

Review of the knowledge available in the scientific literature about nutritional therapy of peptic ulcer, without restrictions of date, based on Scielo, PubMed, Medline, ISI, and Scopus databases. Was also included data from national and international health committees. For the search in databases, were used the following descriptors: dietotherapy, nutrition, peptic ulcer, *Helicobacter pylori*, pepper, iron, protein, antioxidants, bioavailability of nutrients, food fibers, zinc, probiotics, vitamin C and E.

RESULTS

Physiopathology and etiology

Peptic ulcer is characterized by a solution of continuity the upper digestive tract mucosa exposed to chloride peptic secretion. It often occurs in the duodenum (5-10% of the population), stomach or esophagus³⁶. It is a chronic disease, with activation and remission periods and its pathogenesis is characterized by the imbalance between the factors that damages the mucosa (chloride acid, pepsin, and ulcerogenic drugs) and those that protect it (mucosal barrier, prostaglandins, and mucosal secretion)¹⁸. Clinical manifestations are characterized by epigastric discomfort, burning or severe and continuous pain, which tends to be worse at night. Pain usually happens one to three hours after eating, and may be followed by nausea, vomiting, discomfort in the gastrointestinal tract, flatulence, and significant loss of body weight²².

Important factors in the etiopathogenesis are tobacco, alcohol, and *Helicobacter pylori*, which is able to move in high viscosity medium, adhering to the mucosa epithelium, where it remains protected¹⁸. Diagnosis of this infection may be achieved through various tests, each with a sensitivity and specificity above 80%. The golden standard test is the upper endoscopy, which allows the physician to collect material to check for the presence of *H. pylori* besides other therapeutic procedures³⁶.

Nutritional assessment on peptic ulcer

It aims to identify possible nutritional alterations and determine proper intervention to ensure the individuals' health. Malnutrition in this case may occur especially when there is stenosis, which prevents normal ingestion of foods¹⁸.

For nutritional assessment, some important indicators are used in this process, such as the anthropometric, biochemical, and clinical evaluations. The anthropometric assessment consists of weight and height measurements that may be used in conjunction in the assessment of the nutritional status by means of BMI (Body Mass Index), but this method does not distinguishes losses of fat or lean mass. In addition, weight may be concealed by hyper-hydration or de-hydration, thus not resulting in an accurate determination of the nutritional status in these specific cases¹⁸.

Total body bioelectrical impedance is a method

used to measure the body mass, liquid volume, and body fat, being recognized by the Brazilian Ministry of Health and the Food and a Food and Drug Administration as a valuable technique for this purpose¹⁴. Indirect calorimetry is a non-invasive method to determine the nutritional needs and the utilization rate of energy substrates from oxygen consumption and carbon dioxide production obtained by analysis of the inhaled and exhaled air by the lungs⁸.

The upper arm muscle circumference is a measure to assess somatic protein compartment, and the corrected muscle arm area is a more accurate method because it reflects the actual magnitude of muscle tissue alterations appropriately. The triceps skinfold is the most used skinfold because it is the triceps region that best represents the adipose subcutaneous layer²⁸.

Biochemical tests are able to diagnose possible deficiencies still in the subclinical phase and includes serum albumin, which plays a key role in the nutritional assessment - serum pre-albumin a sensitive indicator of protein deficiency -, having several advantages to help determine the nutritional status and intervention needs¹⁸. Complete blood test is often used in this case, because it involves counts of white and red blood cells, reticulocytes and platelet, hematological indices, thus allows to monitor blood alterations and a progress analysis of the disease¹⁸. Nitrogen balance is a noninvasive and accessible technique consisting of the difference between taken-in oxygen and excreted oxygen used to assess metabolic stress, and is a good parameter to assess protein intake and protein degradation¹⁷.

Characteristics of nutritional therapy

The objective of peptic ulcer dietotherapy is to prevent hyper secretion of peptic chloride in order to reduce the sore and pain in the gastric and duodenal mucosa. In addition, nutritional therapy aims to promote healing, based on a complex sequence of events going from the initial trauma to the repair of the damaged tissue. Investigation of nutritional deficiencies is essential in the preparation of an appropriate recovery diet. In the early 20th century, Sippy proposed a diet based on milk and milk cream, combined with antacids, for treatment of gastrointestinal ulcer, based on the principle that milk would provide gastric alkalization and relieve pain. Today milk is not recommended due to the buffering effect and the significant gastric acid secretion effect of milk²⁹.

According to Marrota and Floch¹⁸, calories distribution for patients with peptic ulcer should be normal, with values ranging from 50-60% of carbohydrates, 10-15% of proteins, and 25-30% of lipids, with total energy value sufficient to maintain or recover the nutritional status.

Reis²⁹ suggested that calories distribution should be adjusted according to the patient's needs to normalize the nutritional status, having as recommended macronutrients a protein intake of up to 1.2 g/kg/weight/day in the acute stage (5th to 8th week) and up to 1.5 g/kg/weight/day in the recovery stage. Carbohydrates should be adjusted to the patient's needs, without disaccharides concentration, so as to avoid fermentation, and lipids without concentration of saturated fats.

To accelerate the healing process, in addition to protein, there are specific micronutrients such as zinc, which is essential to maintain the immune system function, as a response to oxidative stress, and to heal wounds²⁵. Selenium may reduce infection complications and improve healing¹⁰. In addition, vitamin A may be used as a supplement, but the research that supports this practice is of limited effectiveness, because very high dosages do not promote cure, and excessive intake may be toxic². Nutritional recommendations for patients with peptic ulcer are described in Table 1.

Despite the small number of references covering the required amounts of nutrients in the treatment of peptic ulcer, it can be seen that the authors agree with the recommendations to improve healing, differing only when the patient is in the active or remission phase. Therefore, to help plan a more specific and safe action, it is important to investigate the individual's nutritional status and if the patient has any associated pathology.

TABLE 1 - Recommended daily diet for peptic ulcer

Characteristics	Recommendations	
Daily energy needs (DEN)	Sufficient to maintain or recover the nutritional status 20-25 Kcal/Kg: weight loss 25-30 Kcal/Kg: maintenance 30-35 Kcal/Kg: weight gain ³¹	
	Acute phase	Recovery phase
Carbohydrate (%) ²⁹	50-60	50-60
Protein (g/Kg/weight) ²⁹	1.2	1.5
Lipid (%) ^{18,29}	25-30	25-30
Zinc (mg) ¹³	11	40
Selenium (µg) ²⁰	55	400
Vitamin A (µg) ¹³	900	3000
Vitamin C (mg) ¹³	75	500
Vitamin B ₁₂ (µg) ¹³	2.4	2.4
Folic acid (µg) ¹³	400	400
Iron (mg) ¹³	45	45
Fibers (g) ¹³	20 to 30	20 to 30
Probiotics (UFC/day) ¹⁸	10 ⁹ to 10 ¹¹ lactic acid bacteria	10 ⁹ to 10 ¹¹ lactic acid bacteria

Sources: ¹⁸Marrota; Flock (1993); ²⁹Reis (2003); ¹³DRI'S (UL); ¹³DRI'S (RDA)

Use of food fibers in peptic ulcer treatment

The physicochemical properties of fiber fractions produce different physiological effects in the organism. Soluble fibers, found in apple, oatmeal, and pear are responsible, for instance, for an increased viscosity in the intestinal content. Insoluble fibers (whole grains, granola, flaxseed) increase stool bulk, reduce transit time in the large intestine, and make fecal elimination easier and quicker. Fibers regulate the bowel function, which make them vital for the well being of healthy people and in the dietary treatment of many pathologies¹⁹.

Räihä et al.²⁶ reported a large number of patients with peptic ulcer having diets poor in fibers and antioxidants. A diet rich in fibers for individuals with peptic ulcer is advisable (20 to 30 g/day, according to WHO – World Health Organization), because fibers act as buffers, reducing concentrations of bile acids in the stomach and the intestinal transit time, resulting in less abdominal bloating, thus decreasing discomfort and pain in the gastrointestinal tract¹⁸.

Use of probiotics in peptic ulcer

Probiotics are defined as a food supplement based on live microorganisms, which affect beneficially the human organism by providing a microbial balance³³. There is a

special interest in probiotics for treating infection by *H. pylori*, because it plays a crucial role in the pathogenesis of chronic gastritis and peptic ulcer in adults⁹. Probiotics have therapeutic agents against *H. pylori*, which can be shown by clinical data that prove the efficacy of some probiotics in diverse gastrointestinal diseases and also due to the increasing resistance of pathogenic bacteria to antibiotics³⁵.

One of the measures that may contribute to reduce the infection rate by *H. pylori* is dietary modulation with the addition of probiotics. However, probiotic organisms do not appear to eradicate *H. pylori*, but have the ability to reduce the bacterial load and infection in animals and humans³². Studies on humans indicate that probiotics improve slightly the elimination rate in treatment against *H. pylori*, being useful to decrease the bacterial load and likely improve dyspeptic symptoms³⁷. Thus, an intake of 10⁹ to 10¹¹ CFU/day of lactic acid bacteria is recommended.

Among the clinical applications of probiotics, reduction of the side effects associated with antibiotics is the best indication documented. According to Cats et al.⁴, who conducted an intervention study, 14 patients infected with *H. pylori* receiving *L. acidophilus* (10⁸ CFU) for three weeks, it was capable of inhibiting the growth *H. pylori* in 64% of the volunteers. Similarly, in a study by Wang et al.³⁸ with 59 volunteers, they received *Bifidobacterium animalis* and *L. acidophilus* (10¹⁰ CFU) twice a day during six weeks, and concluded that regular intake of yogurt containing *Bifidobacterium animalis* and *L. acidophilus* can effectively suppress the infection caused by *H. pylori* in humans.

Use of antioxidants to eradicate Helicobacter pylori

Some authors show that the best treatment is the eradication of the bacteria¹⁸. Accordingly, some studies in humans⁴⁰ used antioxidants to eradicate *H. Pylori* and observed that vitamin C has important effects in the bacteria eradication in patients with peptic ulcer. But these studies showed that smaller doses of vitamin C for a longer period of time had a better response when compared with higher doses. Thus, it is observed that patients with peptic ulcer by *H. pylori* can take up to 500 mg/day of vitamin C for a period of three months, which does not exceed the recommended UL of 2000 mg, according to DRIs¹³.

Another antioxidant used to eradicate *H. pylori* is the capsaicin present in pepper and chilies. Studies on animals showed that capsaicin has effect in healing gastrointestinal lesions. Likewise, some researchers³⁹ studied the effect of capsaicinoids in individuals with peptic ulcer by *H. pylori* or aspirin and showed that these substances are gastroprotective only in individuals with aspirin-induced lesions. It is worth noting that peppers may be associated with irritations in the gastric mucosa, and may not have a gastroprotective effect in some individuals with peptic ulcer.

Substances that can potentiate peptic ulcer symptoms

According to César et al.⁵, damages caused by ulcer can be reverted, often after treatment of an infection caused *H.*

TABLE 2 - Allowed foods, foods that should be consumed with caution, and foods that must be avoided

Food groups	Allowed	Use with caution	Prohibited
Dairy	Milk, low-fat cheeses, yogurt, fermented milk	Fatty cheeses (mascarpone, cream cheese, gorgonzola)	-
Oilseeds	Flaxseed, Brazilian nut, walnuts	-	-
Oils and olive oils	Vegetable oils, olive oil	-	Fried foods
Fruits	Apple, papaya, melon, banana	Orange, pineapple, acerola, passion fruit	Lemon
Vegetables	Leafy dark green vegetables, carrot, beet, green bean, spinach, kale, radish, zucchini, leek	Broccoli, cauliflower, cabbage, cucumber, onion, red pepper	Spicy peppers (black pepper, chilies)
Legumes	Bean soup, lentils, chickpeas, soybean	Beans	-
Meats	Lean meat (beef, pork, chicken, fish)	Fatty meats, organ meats and sausages	-
Sweets	-	Concentrated sweets	Chocolate
Beverages	Natural juices	Citrus/acidic fruit juices	Coffee, black tea, fizzy/cola drinks
Other foods	-	Industrialized seasonings, spices and condiments (Ketchup, mayonnaise, mustard)	Mustard grain

Pylori, by changing diet and lifestyle. Ferri-De-Barros et al.¹¹ observed that alcohol consumption causes damages to the digestive tract with appearance of symptoms of ulcer and other alcohol-related diseases, such as esophagitis, chronic pancreatitis, gastritis, among others.

According to Reis²⁹, smoking diminishes secretion of mucus and bicarbonate, raising the duodenal and gastric flow and increasing the risk of ulcers formation. Prospective and retrospective studies show higher mortality from peptic ulcer in smokers when compared to nonsmokers. Researches show that, among other tobacco constituents, nicotine accounts for most of the peptic ulcer development, because it has a harmful effect on the protective mucus of the gastric epithelium, altering bicarbonate³⁰.

Coffee, even decaffeinated coffee, raises gastric acid production, resulting in mucosal irritations. The same goes for soft drinks, which, besides increasing acid production, are gaseous and cause gastric distension and is dyspepsia-related¹⁸. However, it is important to take into account individual tolerances, with attention to the existence of misconceptions about foods and their actions in the body. Table 2 indicates foods that are prohibited and should be avoided by people with peptic ulcer.

Antacids versus nutrients bioavailability

Deficiency of vitamin B₁₂ is common in patients with peptic ulcer due to the prolonged use of antacids, making difficult the bioavailability of this vitamin. Vitamin B₁₂ can be synthesized by the intestinal microbiota in the colon, but is not absorbed. Deficiency of this vitamin causes impaired cell division and megaloblastic anemia. It is estimated that 80-90% of patients lacking vitamin B₁₂ develop neurological alterations, if not treated²⁴. As a result, recommendation is for 2.4 µg/day of this vitamin, which can be obtained from animal foods, such as milk, meat and eggs.

Absorption of folic acid can be impaired in subjects that make chronic use of aluminum-based antacids (Pepsamar®, Gastran®, Alca-Luftal®), because antacids make the pH of the jejunum more alkaline²³. In these cases, intake of 400 µg/day of this vitamin is necessary, which can be supplied with ingestion of leguminous foods, such as lentils, and meats. It is important to emphasize that the reduction of the gastric acidity by antacids or antiulcers (Lanzol®, Prazol®, Omeoprazol®) alters proteins digestion and affects good digestion of foods²¹.

Antacids can also diminish absorption of iron, causing iron-deficiency anemia. Gastrointestinal bleeding can be observed in gastroduodenal ulcer and infection by *H. pylori*¹ and may be associated with the development of anemia. Gastric bleeding is a major complication of peptic ulcer²².

Infection by *H. pylori* can also lead to an imbalance of body iron homeostasis due to the growing demand for iron by the same. Similarly to other kinds of bacteria, iron is essential for the growth of *H. pylori*¹. To prevent or even treat iron deficiency, an intake of 45 mg of iron daily is recommended, which can be supplied by the ingestion of meats, the main source of heme iron. It is estimated that 100 g of meat correspond to 1 kg of beans (non-heme iron). The concomitant consumption of fruit juice containing vitamin C enhances the non-heme iron absorption from the diet¹.

Alternative treatments without proven efficacy in peptic ulcer

The potential of plants as source of new drugs still offers a large field for scientific research. Even if is observed a large number of known plants, a small percentage has already been phytochemically investigated and only a fraction of them has already been assessed to determine its pharmacological potential. Even among traditional medicinal plants there is still a large percentage that has not been studied to confirm

their efficacy and safety in humans²⁷.

In peptic ulcer this is also observed. In a study conducted by Mentz and Schenkel²⁰, in which they assessed plants with popularly known effects to scientifically prove them, they observed that plants like *Symphytum Officinale* L. (Comfrey), besides having no proven efficacy it may be harmful because of their pyrrolizidine alkaloids, of proven hepatotoxic action. Another studied plant was *Zantoxylon rhoifolium* Lan ("mamica-de-cadela"), popularly indicated for ulcers and healing, but its benefits have not been proved either. In addition, *Maytenus ilicifolia* Mart, commonly known in Brazil as "espinheira-santa", used for healing peptic ulcer, has not proven this effect in trials either.

Studied the effects of *Peumus boldus* ("boldo") and *Baccharis genistelloides* ("carqueja"), both commonly used to treat digestive problems and ulcers. The studies that proved various activities popularly attributed to these plants are associated with the isolate chemical compounds, such as, for example, flavonoids, antioxidants found both in boldo and carqueja leaves. However, the benefits of these teas in the cure of peptic ulcer have not been scientifically proven²⁷.

The use of natural products in treatment of ulcer has been widely studied. However, most of the studies⁷ that have proven an anti-ulcer effect were conducted with animals, and therefore do not provide reliability for alternative treatments in the prevention of relapses or for treatment of peptic ulcer in humans.

CONCLUSION

A balanced diet is vital in the treatment of peptic ulcer, once food can prevent, treat or even alleviate the symptoms involving this pathology. However, there are few papers that innovate dietotherapy; so additional studies addressing more specifically the dietotherapy for treatment of peptic ulcer, a disease that affects a large part of the population, are necessary.

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