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REVIEW ARTICLE

Dietary recommendations in patients with deficiency anaemia

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Abstract A diet deficient in iron, vitamin B9 (folic acid) and/or vitamin B12 (cobalamin) can affect erythropoiesis and cause anaemia. Treatment consists in the administration of supplements to compensate for dietary deficiencies and build up body reserves. Pharmacological treatment should be complemented by a diet designed to supply the micronutrients lacking in food. Patients should continue to follow the diet even after completing their therapy in order to prevent a recurrence of deficiency anaemia.

Nutritionists should understand deficiency anaemia, and physicians, particularly general practitioners, should be aware of dietary requirements. In this article, therefore, both health care professionals have come together to briefly explain, with examples, the type of diet that should be recommended to patients with deficiency anaemia.

PALABRAS CLAVE
Dieta;
Anemia;
Hierro;
Ácido Fólico;
Vitamina B12

Recomendaciones nutricionales en pacientes con anemia carencial

Resumen Una dieta deficiente en hierro, vitamina B9 (folato) y/o vitamina B12 (cobalamina) ocasiona alteraciones en la eritropoyesis causando una anemia. El tratamiento se basa en administrar suplementos exógenos a fin de cubrir el déficit y restaurar las reservas corporales. Como complemento al manejo farmacológico debe diseñarse una dieta que facilite la disponibilidad de los micronutrientes en carencia en los alimentos durante el tratamiento y aun cuando éste termine, con la finalidad que el paciente conserve estos hábitos alimenticios y evite futuros eventos de anemia carencial.

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Los nutriólogos deben dominar el tema y no debe ser ajeno para los médicos, especialmente para el médico general, por lo cual el presente trabajo fue elaborado de forma conjunta por ambos profesionistas, a fin de servir al lector como una guía rápida con ejemplos concretos de dietas para este tipo de pacientes.

Introduction

Deficiency anaemias are a group of diseases caused by a diet lacking in the essential nutrients needed for erythropoiesis: iron, vitamin B12 and folic acid (vitamin B9).[1] These anaemias are usually found in malnourished elderly individuals, young people following weight loss regimens, and individuals in the low-income range, or with a comorbid condition (for example, incomplete dentition) that prevents them from following a healthy diet. It is also prevalent at certain stages in life, such as pregnancy, breast feeding, childhood and adolescence, when bodily nutritional requirements increase.[2]

Iron deficiency is the most common cause of anaemia worldwide, accounting for around 50% of all cases.[3] This is followed by megaloblastic anaemia caused by a diet deficient in B-group vitamins.[2]

The best and most sustainable strategy for preventing micronutrient deficiency is dietary improvement. Dietary changes can also act as a complement to pharmacological therapy, either by providing additional nutrients or by preventing adverse interactions between dietary supplements and food. Despite efforts to raise awareness of the need for dietary changes in these patients, most practitioners do not know which foods are really effective in correcting each type of anaemia.[4] This is further aggravated by widely held popular misconceptions or the out-dated scientific belief that iron-rich vegetables such as spinach or chard are good for anaemia, without considering the bioavailability of the inorganic (non-heme) iron in these vegetables and the limited capacity of the human digestive system to absorb it.[5] Sotelo et al. made a major contribution to this topic by analysing the vegetables most widely consumed in Mexico. The group found high concentrations not only of iron, but also of oxalate, tannins and phytates, which interact with iron and other proteins to form complexes that are hard to digest and prevent absorption.[6]

In the following paragraphs we will give a brief overview of nutritional recommendations for patients with deficiency anaemia.

Iron deficiency

Iron is the second most abundant metal in the earth's crust. It is essential for life due to its role in nearly all redox reactions, and is a vital component in several bodily function, primarily haemoglobin synthesis and transport of oxygen throughout the body.[7]

A normal diet contains around 6 mg of iron for every 1000 calories. This gives a daily iron intake of between 13 and 20 mg, of which between 5% and 15% of iron in ferrous form is absorbed by the duodenum and upper jejunum (1–2 mg/day).[8]

Adult men and postmenopausal women need 8 mg of iron per day. Breast feeding mothers need 9 mg/day, or 10 mg/day in the case of an adolescent mother (14–18 years). Adolescent boys need at least 11 mg/day of iron. Adolescent girls need 15/mg/day; a requirement that increases to 18 mg/day in women aged over 18 years, and persists until they reach the menopause. Iron intake requirements reach a peak in pregnant women, both adolescent and adult, who need 27 mg/day. In all the foregoing cases, iron intake should never exceed 45 mg/day.[9,10]

Iron is present in the diet in 2 forms: heme (organic), of which 15–25% is absorbed, is commonly found in red meat, fish and poultry, and non-heme (inorganic), usually found in pulses, grains and fruit, of which only 5–20% is absorbed.[9] Table 1 shows the primary source of dietary iron.[11] Fig. 1 shows an example of a balanced diet capable of providing 26.1 mg/day of iron.

Folic acid (vitamin B9) deficiency

Folic acid is mainly absorbed in the jejunum and ileum, the only organs containing the intraluminal enzymes needed to transform the polyglutamates found in folic acid (the form in which they are found in food) into monoglutamates. This is why only 25–50% of dietary vitamin B9 is bioavailable. Enterocytes transform folic acid into methyltetrahydrofolate, which is absorbed by the cells and converted into tetrahydrofolate, the active form of vitamin B9. Tetrahydrofolate has a role in several cellular processes, one of the most important being thymine synthesis, which is essential for the production of nucleic acid.[2,9,12]

Folic acid supplements are more effective in increasing serum levels than dietary folate. Folate is absorbed by passive transport following intake of large amounts of folic acid. According to guidelines, adults should take 400 mcg/day, pregnant women 600 mcg/day, and breastfeeding mothers 500 mcg/day. In all cases, intake is limited to 1000 mcg/day.[2,9,12]

The most folate-rich foods include fortified cereals, red and white pinto beans (cooked), lentils, beetroot, asparagus, spinach, romaine lettuce, broccoli, and oranges. Table 2 shows the folic acid content of various foods.[11,13] There are 150 different forms of folate, and between 50% and 90% of