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ORIGINAL ARTICLE

Nutritional assessment of gluten-free diet. Is gluten-free diet deficient in some nutrient?☆

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Abstract
Introduction: The gluten-free diet has traditionally been accepted as a healthy diet, but there are articles advocating that it may have some nutritional deficiencies. The current study assesses whether there was any change in the contribution of calories, essential elements, proportion of fatty acids, vitamins, minerals and fibre in children who were diagnosed with celiac diseases, on comparing the diet with gluten prior to one year after diagnosis with the diet without gluten at the year of diagnosis. The level of clinical or analytical impact that nutritional deficits could have was also assessed.
Materials and methods: A prospective, descriptive, observational study was conducted in which information was collected from a dietary survey; anthropometric and analytical data were collected at pre-diagnosis of celiac disease and following a gluten diet and one year after celiac disease diagnosis, under gluten-free diet.
Results: A total of 37 patients meet the study criteria. A decrease in the intake of saturated fatty acids was found, with an increase of monounsaturated fatty acids and an increase in the intake of phosphorus in the diet without gluten. A deficient intake of vitamin D was found in both diets. Clinically, at year of gluten-free diet there was an improvement in weight and size. Analytically, there was an improvement in haemoglobin, ferritin, vitamin D, and parathyroid hormone in plasma.
Conclusion: The gluten-free diet has minimal deficiencies, similar to those present in the diet with gluten, with an improvement in the lipid profile by increasing the proportion of monounsaturated fatty acids to the detriment of saturated fatty acids.

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Ácidos grasos poliinsaturados;
Vitamina D

Valoración nutricional de la dieta sin gluten. ¿Es la dieta sin gluten deficitaria en algún nutriente?

Resumen
Introducción: Clásicamente, se ha presentado la dieta sin gluten como una dieta sana, pero existen artículos que defienden que puede presentar algunas deficiencias nutricionales. En el presente estudio se valoró si existía algún cambio en los aportes de calorías, principios inmediatos, proporción de ácidos grasos, vitaminas, minerales y fibra en los niños que eran diagnosticados de celiaquía, comparando la dieta con gluten previa al diagnóstico con la dieta al año del diagnóstico sin gluten. También se valoró el grado de repercusión clínico o analítico que podrían tener los déficits nutricionales.
Material y métodos: Estudio observacional, descriptivo y prospectivo en el cual se recogieron los datos de encuesta dietéticas, antropometría y analítica previas al diagnóstico de celiaquía siguiendo dieta con gluten y al año del diagnóstico, con dieta sin gluten de los pacientes diagnosticados de enfermedad celíaca.
Resultados: Treinta y siete pacientes reúnen criterios de estudio. Se encontró una disminución en la ingesta de ácidos grasos saturados, con un aumento de monoinsaturados, un aumento en la ingesta de fósforo en la dieta sin gluten y un ingesta deficitaria de vitamina D en ambas dietas. Clínicamente, al año de dieta sin gluten hay mejoría en el peso y la talla. Analíticamente, hay mejoría en las cifras de hemoglobina, ferritina, vitamina D y parathormona plasmáticos.
Conclusión: La dieta sin gluten presenta mínimas deficiencias, similares a las presentes en la dieta con gluten, con una mejoría en el perfil lipídico, aumentando la proporción de ácidos grasos monoinsaturados en detrimento de los ácidos grasos saturados.

Introduction

Coeliac disease is a systemic immune disease caused by gluten and related prolamines in genetically susceptible individuals, and characterised by the presence of a variable combination of clinical manifestations that depend on gluten intake, specific antibodies, the HLA-DQ2 or HLA-DQ8 haplotypes, and enteropathy.[1] The treatment of coeliac disease requires a life-long diet with exclusion of all foods containing gluten or related prolamines. The gluten-free diet has traditionally been declared healthy, but there are studies that suggest that it may be associated to some nutritional deficiencies due to the exclusion of gluten-containing cereals, which are rich in iron, fibre and B-group vitamins.[2,3] Thus, the literature includes reports of decreased intakes of group-B vitamins, calcium, vitamin D, magnesium, iron, folic acid and fibre, which could have an impact on blood levels, with decreased concentrations of vitamin B6, vitamin B12 and vitamin D, and in the development of anaemia and osteopaenia. This deficient intake is partly due to the lower fibre, iron, folate, thiamine, riboflavin and niacin content of gluten-free foods.[3–5] When it comes to macronutrients, the literature has descriptions of higher intakes of lipids and lower intakes of carbohydrates, which may be attributable to processed gluten-free foods usually being rich in fats and sugars with a high glycaemic index.[3,5] This fact may have clinical repercussions in the form of an increased incidence of overweight or obesity in coeliac children on such a diet,[4,6] as well as the presence of a serum fatty acid (FA) profile with a predominance of saturated and monounsaturated FAs and low concentrations of polyunsaturated FAs.[7]

The aim of our study was to analyse whether there were any changes in the intake of energy, essential nutrients, proportion of FAs, vitamins, dietary elements (iron, calcium, zinc, phosphorus) and fibre in the diet of children diagnosed with coeliac disease. Our secondary goal was to assess whether the gluten-free diet can be deficient in any nutrients for coeliac children, and the extent to which such deficits may impact the patients.

Materials and methods

We conducted an observational, descriptive and prospective study in which we collected data for the patients diagnosed with coeliac disease in the paediatric digestive diseases unit over 2 years, from April 1, 2011 to March 31, 2013. For each patient, we collected data corresponding to one year. A food questionnaire was completed on 3 alternating days (one of them on a holiday or weekend) before the start of the gluten-free diet, and again one year after diagnosis, when the patient was on a strict gluten-free diet. We directed the parents or guardians of the children to document with the utmost possible accuracy the amounts of food ingested, how the foods were prepared, and the brands of the products consumed. We evaluated the following: energy intake and percentage of calories consumed relative to the patient's energy requirements calculated by means of the Schofield equation for weight, height and level of activity (the level of activity was estimated based on the information gathered from the parents in the clinical interview at the time of diagnosis); the percentage of carbohydrates, proteins, lipids and FA composition of the total consumed; the percentage