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Assessment of nutritional habits and nutrition status in patients with Crohn's disease before Exclusive Enteral Nutrition and after gaining remission

Q1 Agnieszka Koziół-Kozakowska^{1,*}, Agata Wasilewska¹, Beata Piórecka²,
Krzysztof Fyderek¹

Q2¹ Department of Paediatrics Gastroenterology and Nutrition, Jagiellonian University Medical College, Poland

² Human Nutrition Department, Public Health Institute, Jagiellonian University, Medical College, Poland

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ABSTRACT

Introduction: Chronic inflammation present in Crohn's disease, absorptive disorders, dietary self-restrictions imposed to avoid symptoms – all lead to chronic malnutrition. **Aim:** The aim of the study was to assess the nutritional status and habits of patients before Exclusive Enteral Nutrition (EEN) therapy and during remissions. **Materials and method:** Thirty children with newly diagnosed mild to moderate Crohn's disease, at the age of 7 to 17 years, hospitalized in the University Children's Hospital, qualified to EEN induction treatment, were enrolled in to the study. The patients from the study group underwent anthropometric assessments and blood tests twice (before EEN and after gaining remission). Standard laboratory test as well as a food frequency questionnaire (FFQ) and a 24-hour nutrition report from the last three days. **Results:** In result, 24 children gained remission (PCDAI ≤ 10 points) after 6-weeks period of EEN and were compared to 24 children of the same age from control group in terms of nutritional habits. Upon diagnosis, 71% of the patients showed insufficient body weight after 6 weeks of treatment, proper BMI met 34% patients. In remission patients still do not reach their daily caloric requirements (on average intake 70%). The norms for calcium and vitamin D and fiber were not met. **Conclusion:** As a result of the implemented therapy, body mass increase was noted in all children. The research shows that a diet used in the remission is improper in terms of energy intake same nutrients which involves the risk of qualitative insufficiencies.

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Introduction

Crohn's disease is a chronic inflammatory condition of multi-factor etiology, originating in the digestive tract. In

spite of the growing incidence, especially in the pediatric population (in Europe, the incidence is 1–8 individuals per 1 000 000), the etiopathogenesis of the disease remains unknown [1]. The genetic, environmental, immunological factors and intestinal microbiota influence on emerging and

* Corresponding author at: Wielicka str. 265, 30-663 Kraków, Poland. Tel.: +48 12 657 40 12.

E-mail address: agnieszka.koziol-kozakowska@uj.edu.pl (A. Koziół-Kozakowska).

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maintaining chronic inflammation. Upsetting the balance between the primary and adaptive immunological response in genetically predisposed individuals leads to stimulation of T cells, prevalent synthesis of pro-inflammatory cytokine (TNF- α , IL-2, IL-12, and IL-18) along with uncontrolled development and progress of inflammation [2]. A chronic inflammation results in malnutrition, distorted body mass composition (particularly deficiencies in fat-free body mass), lowered mineral density of bones, and in children – also leads to pubertal delayed and lower high velocity (10% of cases) [3].

Crohn's disease is diagnosed on the basis of modified Porto criteria and it involves a number of clinical, laboratory, endoscopy and imaging assays [4]. Among the most frequently found digestive tract symptoms are: stomach aches (75% of cases), diarrhea, loss of body mass. Nutrition disorders in Crohn's disease are caused by increased resting energy expenditure, malabsorption, excessive loss of nutrients in the digestive tract, insufficient supply of food (fear of triggering pain), or the treatment administered (steroid therapy). Even patients with proper BMI or overweight ones present disorders in body composition, i.e. reduced fat free mass [5].

Exclusive Enteral Nutrition (EEN) with polymeric diet is the first-line treatment in mild and moderate Crohn's disease. The effectiveness of such treatment is similar to corticosteroid treatment (80%), less the side effects of the latter [6]. It promotes mucosal healing, thus preventing CD characteristic complications, reduces the levels of inflammatory markers (e.g. SR, ESR, CRP, calprotectin in stool), improves nutrition and fosters rebalancing of nutrition deficiencies. Polymeric diet implemented orally or via nasogastric tube, depending on the patient's choice.

So far, there are no guidelines as to the duration of such treatment (most often, 6–8 week periods are implemented) [7].

Once remission is obtained and a standard diet is re-introduced, auxiliary nutritional therapy is administered, involving polymeric formulas and a light diet, with no particular quality restrictions, especially as far as fiber intake is concerned, as it is now seen as a factor protecting the intestinal mucosa. There have also been reports of fiber's potentially positive influence on gaining and maintain remissions [8–10]. The diet of patients with correct BMI and body composition should be adapted to their age, while in patients who display the risk of malnutrition, the caloric value may even be 150% of the daily energy needs; for protein intake, the amount is defined individually within the range from 1.5 up to 3 g/kg of body weight per 24 hours [11].

The aim of the research was to assess the nutritional habits and nutrition status of patients before nutritional therapy and during remissions.

Materials and method

The study was conducted at the Department of Paediatrics, Gastroenterology and Nutrition, Jagiellonian University Collegium Medicum, between September 2015 and August 2016. Thirty children aged 7–17 years old with recently diagnosed mild or moderate Crohn's disease (PCDAI – Paediatric

Crohn's Disease Activity Index <40 points) were included into the research. Crohn's disease was diagnosed in accordance to modified Porto criteria, based on interviews and physical examinations as well as digestive tract endoscopy (gastroscopy and colonoscopy with intubation of Bauhin valve and histopathological assay of specimens) and MRI of the intestine. Localisation and disease phenotype were defined according to the Paris classification (B1, location L1, L2, L3) [12]. Excluded from the study were patients with severe or inactive CD, and those with exclusive disease localisation in the upper digestive tract (L4a, L4b), and patients with previous history of steroid therapy. Based on PCDAI, mild CD was diagnosed in 77% (23) of children, moderate in 23%. In all children laboratory test were performed – albumin concentration, defining the norm (in accordance with PCDAI) at ≥ 3.5 g/dl, ESR ≤ 20 mm/h, haematocrit depending on the age and sex: girls (11–19 years old) >34%, boys (11–14) >35%, (15–19) >37% and hemoglobin: between 7 and 13 years old: 11.2 g/dl, in older children: 12 g/dl.

All patients underwent 6-weeks course of EEN remission induction treatment. In sustaining remission both mesalazine and azathioprine were used in all children from the studied group.

Anthropometric assessment of body weight and height were conducted twice: upon diagnosis and after the completion of nutritional therapy. On that basis, the BMI was computed. The index was then used to assess the nutritional status of the children according to the BMI growth charts for girls and boys created with OLA and OLAF studies for children aged 3 to 18 [13].

The children's nutritional behavior was assessed with a questionnaire and a 24-hour dietary interview of past 3 days. The interview was conducted by a dietician upon diagnosis and then during a control visit in the Children's University Hospital after a 5–6 months of nutritional treatment. Up to the control visit only one patient had history of exacerbation, but remained remission during evaluation and had no treatment modification (mild disease activity) and was not excluded from the research. The patients, together with their parents, also filled in a nutrition questionnaire, which studied the following: food frequency (FFQ – Food Frequency Questionnaire); beverage consumption frequency; number and frequency of meals; snacking in-between meals; regularity of meals; consumption of fast-foods; use of dietary supplements; difficulty in introducing new foods; type of foods that the children disliked This questionnaire, was similar as validated Polish questionnaire prepared by the Behavioral Conditions of Nutrition Team, Committee of Human Nutrition Science, Polish Academy of Science. Frequency of consumption was determined in relation to the day, week or month. The survey did not include open-ended questions. In the assessment of the frequency of consumption of selected products, food and beverages were used a 7-point scale. In the rest, the responses assigned integer values, using selected scales, e.g. a two-point scale (1 = no, 2 = yes) [14].

The control group was compiled as part of research conducted by the Human Nutrition Department (IZP) in schools located in Małopolskie Voivodeship, and then a sample selected in consideration of their age and sex

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