Predefined Diets of IBD

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Inflammatory bowel disease (IBD) is a chronic disease mediated by the immune system and characterized by the importance of diet in pathological development.

Inflammatory bowel diseases nutrition therapy

1. Introduction

Inflammatory bowel disease (IBD) is characterized by chronic inflammation of the gastrointestinal tract with periods of remission or recurrence and includes both Crohn's disease (CD) and ulcerative colitis (UC) [1].

In CD, inflammation can be present in any area of the entire gastrointestinal tract, whereas in UC, the inflammatory process affects only the colon [2].

The symptoms of this type of disease are diverse, including the appearance of diarrhea, bloody stools, abdominal pain, fatigue, weight loss, etc. [3]. The prevalence exceeds 0.3% in North America, Oceania, and many European countries, and the incidence of these types of pathologies has increased rapidly in recently industrialized countries, producing a high burden on health systems [4][5].

IBD, apart from being treated with expensive medical treatments to alleviate its activity, leads to a decrease in the patient's quality of life that can affect the degree of disability and work productivity and is associated with more symptoms of anxiety and depression [6][7][8]. In addition, malnutrition and specific nutritional deficiencies are frequent among these types of patients, depending on the state and/or progress of the disease, and most patients impose dietary restrictions based on their own beliefs [9][10].

The etiology of IBD is unknown; in fact, it is a multifactorial disease. However, Westernised lifestyles and diets are one of the main drivers of the increasing incidence [11][12]. Diet plays an important role in the gut's microbial composition and functioning, intestinal barrier, host immunity, and intestinal physiology [12][13].

Regarding nutritional treatment, for artificial nutrition, such as enteral and parenteral nutrition, there is evidence of efficacy [14][15], but for natural nutrition, it seems that a diet that is low in fiber, high in fat, and high in carbohydrates can lead to severe dysbiosis, while one richer in fruits, vegetables, and olive oil could prevent it. However, together with the role of certain foods such as meat, fish, and dairy products, their role in the development of the disease is controversial and uncertain in the absence of studies [16][17][18].

On the other hand, while for pediatric patients it seems that the implementation of predefined diets, such as the specific carbohydrate diet (SCD) or the Crohn's disease exclusion diet (CDED), is positive [19], for the adult population, the studies performed to date have been inconclusive and the findings are inconsistent in addition to being mostly concerned with symptomatology of the inactive disease [20][21][22][23].

Therefore, there is a need for more and clearer evidence that allows health professionals to increase their knowledge in order to advise their patients on what type of specific dietary formulas or nutrients they will need that will allow them not only to comply with nutritional requirements but also to improve the outcome of their symptoms, with positive repercussions for a better quality of life [24][25].

2. Discussion

Our systematic review included a total of 31 studies, which compiled information from 5331 individuals with IBD and who had an intervention with different predefined diets. All the studies had a broad reach, and within the diverse effects found, CDAI, FC, CRP, and ALB were the most common, allowing us to conduct a meta-analysis to arrive at more complete conclusions.

The main premise of these types of diets was based on the reduction of some types of pro-inflammatory foods and the increase of others, which are believed to promote a favorable intestinal microbiota [26]. In combination with the high prevalence of malnutrition, the importance of diets that can modify the intestinal barrier and host immunity must be increased [27][28]. In fact, although we did not observe an amelioration in terms of ALB, CRP, and CF levels, an improvement in CDAI levels was observed through interventions with predefined diets, more specifically of microparticles diet, semi-vegetarian diet, and immunoglobulin exclusion diet, in patients with CD.

The low FODMAP diet (LFD) reduces fermented oligosaccharides, disaccharides, monosaccharides, and polyols because they are poorly absorbed in the small intestine and are fermented by bacteria in the colon, triggering intestinal discomfort and gas in sensitive individuals [29][30][31]. This diet has been used mainly with patients with irritable bowel syndrome; however, it has been transferred to patients with IBD due to the similarity of functional gut symptoms such as bloating, abdominal pain, wind, and diarrhea [32][31]. As for the results obtained in our systematic review, most of the individuals improved their symptoms of the disease [32][33][34][35]. This coincides with other studies, in which an improvement was reported due to the use of an LFD for the treatment of gastrointestinal symptoms [23][36]. Furthermore, according to Pedersen et al., Testa et al., Bodini et al., and Cox et al., the LFD reported a better quality of life, although it was measured with different questionnaires [37][38][39][34]. Results of good adherence to this type of diet have also been reported [32][38][34][40], but in terms of disease activity, the results have been controversial; while for some authors no improvements were found for biomarkers or indices such as CRP, FC, HBI, or IBS-SSS, others did obtain improvements [32][37][38][39][34].

All of this, together with the concern of several authors who expressed the possibility that this type of diet may alter the microbiome by increasing the colonic pH, thereby allowing enteropathogenic colonization and causing an increase in dysbiosis [26][41][42], indicate that the use of supplementation should be considered to avoid deficiencies

that could be caused by an LFD for long periods of time. Furthermore, it is of great importance that it be considered in the “induction” phase of prescription of diet modification, and if patients do not respond to the modification, the FODMAP restriction should be discontinued [41], as it can compromise the nutritional status of the patient and, to some extent, can affect intestinal inflammation [42].

The Specific Carbohydrate Diet (SCD) is based on the hypothesis that IBD patients have a dysfunction of disaccharidases, which are necessary to digest and absorb disaccharides and amylopectin. Therefore, high amounts of these compounds could cause an overgrowth of bacteria and intestinal lesions which can increase the intestinal permeability, and this is why this type of diet allows foods with carbohydrates that consist only of monosaccharides and excludes disaccharides and most polysaccharides [20]. An improvement in the symptomatology and an increase in clinical remissions are the most important results reported by Suskind et al. [39].

Both SCD and LFD have the potential to contribute to vitamin D deficiency. Therefore, their follow-up and clinical evaluation is very important due to the association of this deficiency with an increased risk of surgery and hospitalization [43][44][45][46].

The Immunoglobulin Exclusion Diet (IGED) is a dietary strategy associated with the identification of foods that cause a certain degree of intolerance, meaning an IgG-mediated reaction that acts as a delayed-type hypersensitivity response to antigen exposure, all of which result in excessive protective immune responses that could lead to increased disease activity [47][48][49]. The researchers Rajendran et al., Gunasekeera et al., and Uzunismail obtained improvements in the activity of the pathology through various tools. However, contradictory results were found for symptomatology, quality of life, and certain biochemical parameters such as CRP and ALB [50][51][52][53][54].

Several authors state that vegetarian dietary patterns are associated with a decrease in serum CRP, fibrinogen, and total leukocyte concentrations [55]. This coincides with the results obtained by Chiba et al., in which an improvement in the CRP, symptoms, and certain laboratory data could be observed [56][57]. However, it can cause an increase in posttraumatic stress and poorer mental health [58].

With respect to the Mediterranean diet (MED), characterized by the consumption of important sources of fiber (cereals, legumes, vegetables, fruits, and nuts) and with a high content of chemical compounds with antioxidant properties such as flavonoids, phytosterols, vitamins, terpenes, and polyphenols [43][59], we have obtained positive results with quality of life, HBI, FC, and cholesterol [60][61][62]. Currently, there is some controversy regarding the role of this diet in IBD, as several authors indicated that a healthy diet pattern, which includes the MED, is associated with significant reductions in inflammation-related CRP [63], and other researchers concluded that this type of diet does not have significant effects on inflammatory substances [64].

Also, there is the gluten-free diet (GFD), which eliminates the gliadin protein located in wheat, barley, rye, and other grains. This diet has been traditionally used for patients with celiac disease and more recently in people with

sensitivity to non-celiac gluten [65]. However, the nutrient responsible for improvement is controversial, since these cereals have more than one possible symptom inducer such as gluten, fructans, trypsin amylase inhibitors, and lectins [66][67][68]. The results from our systematic review are controversial. On the one hand, the use of this type of diet improved the symptoms of pathology; however, it could also lead to an increase in anxiety and depression, possibly due to the difficulty of adherence [69][58]. These findings coincide with the results from some authors, who state that GFD, despite the existence of data indicating low adherence, suggests a potential benefit and great utility in the management of IBD [26][44].

Despite being the first systematic review that deals with the general effects of predefined diets on adult patients with IBD, this article is not exempt from limitations. It is possible that the CONSORT questionnaire was not the best for evaluating the Non-randomized controlled clinical trials (NRCCT) and Uncontrolled and non-randomized clinical trial (UNRCT) reviewed; however, we tried to avoid this limitation by adjusting the items of this tool to the type of study, as no questionnaire was found that evaluated the Randomized controlled clinical trial (RCCT), the NRCCT, and the UNRCT [70][71]. Also, some studies were somewhat old, which could have reduced the score of this tool on the methodological quality due to the lack of standard criteria at the time the clinical trials were conducted. The UC and CD data were combined to perform a meta-analysis for the variables CDAI, FC, CRP, and ALB due to the low number of studies that separated these diseases to elaborate on their results and the great variability, not only of the tools used but also of the unit of measurement employed. However, these clinical entities have different clinical courses. The results derived from this work could help in clinical practice to help health professionals, through the creation of a guide oriented towards evaluating the addition of predefined diets within the set of medical therapies for an adult patient diagnosed with IBD. Both clinical trials and observational studies have been used within this systematic review, a parameter that has allowed us to have a more global view of the effect of intervention.

As future lines of research, the use of other types of predefined diets should be considered, which have been observed to show positive results in such patients and for which little evidence is found [72][73][60][74][75][69][76][57][77][78].

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