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CAN ELIMINATION DIETS BE PROMISING FOR NEUROLOGIC DISEASES?

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Review

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Abstract

Medical nutrition interventions are an integral part of the multidisciplinary management of different medical disorders. Food allergies are becoming increasingly common and better recognized. "Elimination diets" are a dietary approach based on the elimination of certain allergenic foods or, in cases where it is not known which foods are allergenic, the elimination of potentially allergenic foods from the diet. Maintaining elimination diets can be highly effective in reducing the symptoms of food allergies. The gut microbiota has important effects on the structure and function of the enteric and central nervous system, including human behavior and brain regulation. The gut-microbiome-brain axis is now recognized as an important part in the regulation of systemic metabolism and homeostasis. Nutrients can cause inflammation by affecting the neural pathways through the vasoconstrictor or vasodilator effects of some of the substances they contain. Therefore, maintaining the gut microbiota and prioritizing anti-inflammatory nutrients and eliminating certain nutrients that are predicted to cause damage to the body are important in the nutritional treatment of neurological diseases. Elimination diets, which are mainly used for food allergies, have been suggested to be effective in the treatment of neurologic diseases. For this reason, it has become the focus of more intensive research in neurological and psychiatric pathologies, especially as it may alleviate emotional eating disorders such as anxiety and depression. The evidence in this review summarizes balanced and

high-quality elimination diets as a promising medical nutrition therapy to support immune and neuronal homeostasis.

Key Words: Food allergy, Elimination diet, Neurologic diseases,

Özet

Tıbbi beslenme müdahaleleri, farklı tıbbi bozuklukların multidisipliner yönetiminin ayrılmaz bir parçasıdır. Besin alerjileri giderek yaygınlaşmakta ve daha iyi tanınmaktadır. "Eliminasyon diyetleri" belli alerjen besinin veya hangi besinin alerjen olduğunun bilinmediği durumlarda muhtemel alerjen besinlerin diyetten çıkarılması esasına dayandırılan diyet yaklaşımıdır. Eliminasyon diyetlerinin devamlılığının sağlanması besin alerjilerinin semptomlarının azalmasında yüksek oranda etkinlik gösterebilmektedir. Bağırsak mikrobiyotası, insan davranışı ve beyin düzenlemesi dahil olmak üzere enterik ve merkezi sinir sisteminin yapısı ve işlevi üzerinde önemli etkilere sahiptir. Bağırsak-mikrobiyom-beyin ekseni artık sistemik metabolizma ve homeostazın düzenlenmesinde önemli bir parça olarak kabul edilmektedir. Besinler içerdikleri bazı maddelerin vazokonstriktör veya vazodilatör etki yapmasıyla sinir yollarını etkileyerek inflamasyon oluşturabilmektedir. Bu nedenle, bağırsak mikrobiyotasını korumak ve antiinflamatuar besinlere öncelik verilip vücutta hasar bırakabilmesi öngörülen bazı besinlerin elimine edilmesi nörolojik hastalıkların beslenme tedavisinde önemli bir yer tutmaktadır. Temelde besin alerjileri için kullanılan eliminasyon diyetleri nörolojik hastalıkların tedavisinde de etkili olabileceği öngörülmüştür. Bu sebeple nörolojik ve psikiyatrik patolojilerde özellikle anksiyete ve depresyon gibi duygusal yeme bozukluklarını hafifletebileceği için daha yoğun araştırmaların odak noktası haline gelmiştir. Bu derlemedeki kanıtlar bağışıklık ve nöronal homeostazı desteklemek için dengeli ve yüksek kaliteli eliminasyon diyetlerini umut verici bir tıbbi beslenme tedavisi olarak özetlemektedir.

Anahtar Kelimeler: Besin alerjisi, Eliminasyon diyeti, Nörolojik hastalıklar

1. Introduction

Food allergy may present with different findings ranging from mild to severe symptoms and may threaten the life of the individual (Akyüz, 2018). Medical nutrition therapy should be organized and implemented in accordance with evidence-based guidelines (Demir, 2019). Although treatment methods are updated, the most basic and effective treatment method is the elimination of the allergenic food from the diet. Elimination dietary approaches are based on the elimination of certain allergenic foods or allergenic foods that are predicted to be allergenic when it is not known what the allergen is. The macronutrients and micronutrients that patients are taking should be evaluated in order to plan alternative nutrient intake to replace the nutrients removed from nutritional therapy, and if deficiency is detected, nutrient and supplementation recommendations should be given. When the elimination diet is maintained, nutrients are highly effective in reducing allergy symptoms. (Özbey and Özçelik, 2019).

Many factors are effective in the emergence of food allergy, for example, intestinal microbiota has a great importance in the formation of food allergy (Çakır & Dokumacıoğlu, 2021). Food allergies can have wide-ranging effects, leading to disturbances in immune regulation, gastroenterological symptoms and neurological diseases (Shulpekova et al., 2021). Foods can cause inflammation by affecting the neural pathways through vasoconstrictor or vasodilator effects of some substances they contain (Özturan et al., 2016). Therefore, protecting the gut microbiota and prioritizing anti-inflammatory nutrients and eliminating some nutrients that are predicted to cause damage in the body may have an important place in medical nutrition therapy of neurologic diseases (Karaağaç et al., 2021).

Elimination of nutrients through medical nutrition therapy may play a role in the pathophysiology of common neurologic diseases such as Alzheimer's disease, Parkinson's disease, migraine and epilepsy. This article summarizes the most common and effective elimination dietary interventions for common neurologic diseases.

1.1. General information

1.1.1. Alzhimer

It is known that Alzheimer's disease does not only occur with aging, environmental factors are also needed. Considering the brain-gut relationship in terms of inflammation, some changes in the gut microbiota may be effective on Alzheimer's disease (Lane et al., 2018). The practice of

healthy behaviours, including healthy eating habits, may be associated with healthy ageing and prolonged life expectancy and reduced risk of cognitive decline. Furthermore, an adequate dietary intervention may help reduce the burden of AD. The most notable dietary approaches for AD are the Mediterranean diet (MeDi) and the DASH diet. Both the DASH diet and MeDi have been shown to improve cognition (Scarmeas et al., 2007). In a study using data from the Nurses' Health Study (NHS), 16,058 women over 70 years of age were followed up for six years and long-term adherence to the MIND diet was associated with better verbal memory scores (Berendsen et al., 2018).

1.1.1. Parkinson

Although the aetiology of Parkinson's disease is not fully understood, dietary factors have been shown to play an important role. There are not many epidemiological data on dietary protein in Parkinson's disease. These preliminary studies, which recommend the use of very low-protein diets and are based on eliminating certain foods from the diet, especially fatty milk and dairy products, have specifically linked frequent consumption of milk and other dairy products with a moderate risk of Parkinson's disease. D (Zappia et al., 2002). A study to evaluate the nutritional status in elderly Parkinson's disease patients in another study, the average body weight loss in Parkinson's patients was 6.2 kg (5.0-10.1 kg). Lean body mass and upper middle arm circumference measurements were not different between the groups. Daily energy intake of Parkinson's patients was found to be high due to high carbohydrate intake. Hellenbrand et al. found that the carbohydrate intake of Parkinson's patients was high. In a contrary study, it was reported that fat intake from animal-derived foods was higher in Parkinson's patients and accordingly their energy intake was high (Hellenbrand et al., 1996).

1.1.2. Migraine

Migraine is a recurrent headache disorder, with typical features lasting 4-72 hours and usually unilateral moderate or severe. Lifestyle intervention is essential in reducing the burden of migraine disease (Baden et al., 2021). Various elimination diet approaches have been proposed to improve the impact of migraine. Migraine sufferers can sometimes be hypersensitive to one or more of the following nutrients and this is sometimes associated with food allergies or intolerances. Foods such as caffeine, alcoholic beverages, cheese and chocolate have been shown to trigger migraines. Elimination diets have been recommended as part of medical nutrition

therapy in migraine treatment (Rautiainen et al., 2012). Elimination diets were given to patients and diets based on the presence of IgE and IgG antibodies were tested in studies based on food allergy. In a study conducted in a school, milk and egg white-specific IgE levels were measured in serum samples of children.As a result of the study, the role of milk and egg allergies in childhood migraine could not be demonstrated, but high specific IgE levels were observed in children with migraine-type headache (Özen et al., 2011).50 migraine patients who stated that migraine attacks started after ingestion of certain foods were divided into two groups and evaluated. The trigger foods (wheat, orange, nescafe, egg, chocolate, cheese, sausage, milk, pickle, alcohol, corn) determined for both group 1 and group 2 were excluded from the diets of the patients. In the study, when foods that trigger migraine attacks were identified, it was observed that restricting the intake of these foods reduced the attacks (Özön et al., 2018). Nutrition containing eliminated foods shows that it can be an effective and reliable treatment method.

1.1.4. Epilepsy

Epilepsy is a neurological disorder that causes seizures due to sudden and uncontrolled burst of electrical activity affecting the brain and nervous system, leading to changes in behaviour, movements, emotions and level of consciousness (Thijs et al., 2019). Throughout history, dietary changes have been mentioned as a potential treatment for epilepsy. In particular, it was thought that dietary interventions could reduce seizure frequency and improve cognition. Interest in the ketogenic diet has increased and evidence has been shown to support its use in paediatric epilepsy and beyond. There are several proposed mechanisms of action for the ketogenic diet, but the exact mechanism is unknown (Pfeifer et al., 2005). With the increasing use of dietary therapy, many alternative diets have emerged. Food allergies as chronic inflammatory processes have been hypothesised to underlie the pathophysiology of refractory idiopathic epilepsy and it has been investigated whether elimination diets can help manage refractory epilepsy (Wang et al., 2021). This paper was conducted on 34 patients with refractory convulsions aged between 3 months and 16 years. Participants were divided into three groups according to the results of skin prick test and serum specific IgE measurement. For breastfed infants older than six months of age, a six-food elimination diet (cow's milk, egg, peanut, soya, wheat, seafood) was initiated in addition to the specific culprit food with positive skin prick test results for both mother and child. Participants were assessed for at least a 50% reduction in the number of seizures following the intervention ($p < 0.001$). Seventeen patients (50%) were seizure-free after 8 weeks of treatment

and 12 patients (35%) had a significant (51-99%) reduction in the number of seizures. Five patients had no change in daily seizure frequency. After 8 weeks of dietary restriction, no seizures occurred. These findings remained unchanged after 4 weeks of follow-up. In conclusion, elimination diets containing six foods (cow's milk, egg, peanut, soya, wheat, wheat, seafood) are recommended especially in the diets of patients with epilepsy. The idea of food allergy as a seizure trigger is quite new and this association may be difficult to confirm. However, when confirmed, it is predicted that it may break new ground in the treatment of refractory convulsions in the paediatric age group (Gorjipour et al., 2019).

2. Conclusions and Recommendations

There is growing evidence emphasizing the role of inflammation as a major cause of neurologic diseases. There are important reasons to believe that allergy may act as an accelerator of poor prognosis in neurologic diseases. However, neither the duration of treatment nor the duration of effect can be known. In particular, the potential for therapeutic benefit from relatively short-term feasible and simple elimination dietary interventions in neurological and psychiatric pathologies raises the possibility of disease amelioration in patients with emotional and behavioral disorders such as anxiety and depression, and the use of elimination diets should be recommended and should become the focus of more intensive research. The evidence summarized in this review suggests that a balanced, high-quality elimination diet for each of the neurologic diseases and to support immunity and neuronal homeostasis may be promising in treatment.

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Conflicts of interest

The author declares no conflict of interest. No financial support has been received from any institution. It has not been presented as an oral / written paper in any congress / symposium etc. It is not produced from a thesis study. Ethics committee permission was not obtained as it is a review article.

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