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Research Article

Should We Recommend a Mediterranean Diet to Acne Vulgaris Patients?

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Abstract

Acne vulgaris is increasingly associated with endocrine signaling influenced by dietary patterns, particularly a Western diet (WD), which is linked to elevated Insulin-Like Growth Factor-1 (IGF-1) levels. IGF-1 plays a central role in acne pathogenesis by promoting lipogenesis, sebocyte growth, androgen synthesis, and keratinocyte proliferation. In contrast, adherence to a Mediterranean Diet (MD), characterized by low glycemic index foods, rich in antioxidants and anti-inflammatory compounds, has been shown to modulate IGF-1 levels and reduce acne severity. This comparative trial investigated the relationship between the MD, IGF-1 serum levels, and acne severity during treatment in 52 participants with mild-to-severe acne. Acne severity was assessed using the Global Acne Grading System (GAGS), while adherence to the MD was evaluated using the PREDIMED questionnaire.

Results revealed a statistically significant reduction in IGF-1 levels among participants following this dietary model compared to those adhering to the WD, particularly in patients with severe acne treated with isotretinoin. These findings suggest a potential synergistic effect between isotretinoin and the MD, enhancing therapeutic outcomes by reducing IGF-1 levels and inflammation. The study underscores the importance of dietary recommendations as part of acne management strategies. Adopting such a diet not only reduces acne severity but also supports hormonal balance and skin health, highlighting its role as a complementary intervention to conventional treatments for acne vulgaris.

Keywords: Acne; Diet; Insulin Like Growth Factor-1; Isotretinoin

Introduction

In recent years, a notable link has been identified between the development of acne vulgaris and the endocrine signaling affected by a Western diet (WD) [1]. At the heart of this connection is the crucial role attributed to Insulin-Like Growth Factor-1 (IGF-1) [2]. This molecule stimulates lipogenesis in sebaceous glands, sebocyte growth, androgen synthesis, and promotes the proliferation of keratinocytes through the activation of its receptor [3]. The regulation of IGF-1 by diet is not fully understood, but several randomized controlled trials have suggested that following a Mediterranean Diet (MD) may reduce the biological activity of IGF-1 [4-7]. This dietary pattern emphasizes healthy foods such as whole grains, fruits, vegetables, seafood, beans, and nuts. *Barrea et al.* suggest that low adherence to the MD could promote ad inflammatory state in acne patients; notably, they found that a PREvención con DIeta MEDiterránea (PREDIMED, a questionnaire used to evaluate adherence to the MD) score of ≤ 9, predicted higher Global Acne Grading System (GAGS) scores [6,8]. The idea is that body composition and diet could serve as indicators of the clinical severity of acne and chronic inflammation. Furthermore, adherence to the MD seems to be inversely related to the severity of acne. Therefore, increasing the intake of foods typical of this diet could offer potential benefits for individuals with acne vulgaris. These findings highlight the importance of dietary interventions in the comprehensive management of acne, providing a promising approach to reduce its severity and associated inflammatory responses [9-11].

Materials and Methods

The aim of this comparative trial was to evaluate the association between the MD and IGF-1 in acne patients, as well as the role of diet on IGF-1 serum levels across different grades of acne severity during treatment. Exclusion criteria were: overweight, underweight, presence of endocrinological pathologies or other diseases or medications that could interfere with IGF-1. The severity of acne vulgaris was evaluated by 2 different dermatologists with experience in acne vulgaris using the GAGS scores, one of the commonest tools used in clinical practice to evaluate acne severity. It considers the involvement of six locations (5 for the face and one for the chest/upper back), each of which has a multiplication factor (Right cheek = 2, Forehead = 2, Left Cheek =2, Chin = 1, Nose = 1, Chest and Upper back = 3). A second multiplication factor is given according to the type of lesions of each region (No lesion =0, One comedone = 1, Papule=2, One pustule = 3, One nodule = 4). The sum of scores multiplied by the multiplication factors gives 6 different local scores, the sum of local scores gives the global score (0-52). The severity is graded as mild if the score was 1-18, moderate with scores form 19-30, severe with scores form 31-38, and as very severe if the score is more than 38 [12]. Every participant was treated according to the clinical European Dermatology Forum guidelines based on acne severity [13]. Specifically, patients with mild acne (GAGS ≤18) received Clindamycin 10 mg/g + tretinoin 0.25 g gel for 3 months; the ones with moderate acne (GAGS 19-30) received oral lymecycline 300 mg + topical benzoyl peroxide 5% gel for 3 months and those with severe acne (GAGS ≥31) received Isotretinoin 0,5 mg/kg/day for 8 months (total cumulative dose: 120 mg/kg). None of the participants had a GAGS score exceeding 38. Each participant underwent clinical evaluation by two different dermatologists at three medical examinations: T0 (initial visit), T1 (after one month of treatment), and T2 (end of treatment, after three months for mild and moderate acne patients, and after eight months for severe acne patients). For patients with severe acne, follow-up occurred every 2 months for a total of 8 months. During each examination the GAGS score was assessed. Adherence to the Mediterranean Diet (MD) was also evaluated using PREDIMED, a validated 14-item questionnaire where each item is scored either one or zero, resulting in a total score ranging from zero to 14 points [8]. Participants were then categorized into two groups: 0-5, indicating low adherence thus corresponding to the Western Diet Group (WD-Group); and 6-14, classified as the Mediterranean Diet Group (MD-Group). The questionnaire was considered valid only if all 14 items were completed. Blood samples were collected from each participant after fasting during T0 and T2 to assess IGF-1 levels. To minimize variability, all samples were analyzed on the same day using identical kits. Subsequently, IGF-1 levels were compared between the MD-Group and WD-Group among patients with mild/moderate acne and severe acne during treatment. The study adhered to good clinical practice guidelines, and the protocol was approved by the local ethics committee. Written consent was obtained from each participant or their guardian (if the participant was under 18 years of age) before enrollment.

Results

The study population comprised of 52 patients aged 14-30 years (medium age was 20 ± 4,6 years); of which 32 were females and 20 males. 25 patients (48%) had a mild/moderate acne and 27 (52%) had a severe form. Based on the PREDIMED score, 38 patients (75%) belonged to the MD-Group while 14 (25%) belonged to the WD-Group. The higher prevalence of a MD in the population can be attributed to the participants' origins, being the majority of Italian descent.

The evaluation of IGF-1 revealed a statistically significant difference ($P < 0.05$) in serum levels between the MD-Group and the WD-Group (Figure 1). Specifically, among patients with severe acne treated with isotretinoin, there was a significant difference ($P < 0.05$) between those in the MD-Group and those in the WD-Group. Interestingly, the most pronounced reduction in IGF-1 levels was observed in patients with severe acne treated

with isotretinoin who belonged to the WD-Group, highlighting the drug's efficacy in controlling IGF-1 levels, particularly in individuals adhering to a WD.

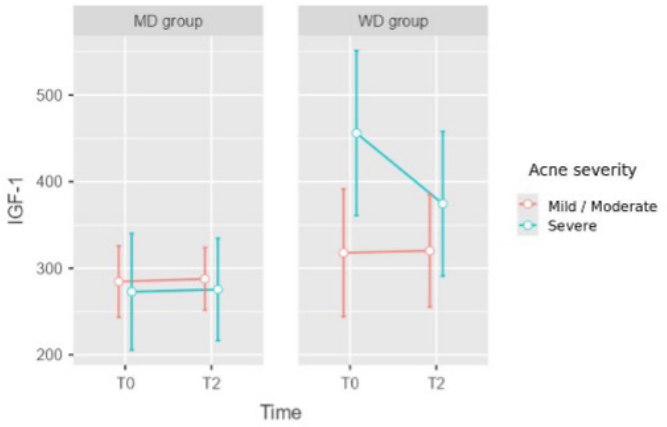

Figure 1: Mean values and 95% confidence interval (95%-CI) of IGF-1 levels stratified by the type of Diet (MD group and WD group) and Acne severity at T0 (first visit) and T2 (end of acne treatment).

Discussion

In recent years, there has been increasing interest in exploring the relationship between diet and inflammation, prompting the investigation of innovative approaches using targeted dietary interventions to manage various types of diseases [14]. Significantly, specific dietary factors such as a high glycemic index have been linked to a notable proacnegenic effect. Similarly, dairy consumption may also demonstrate proacnegenic tendencies, especially in populations where a WD is prevalent [15]. The WD is characterized by high glycemic foods with low fiber content, and multiple trials have demonstrated its association with elevated IGF-1 levels and impaired glycemic control [16].

Conversely, the MD is distinguished by its emphasis on abundant plant foods such as fruits, vegetables, bread, cereals, legumes, nuts, and seeds. It typically includes moderate consumption of fish, poultry, eggs, and dairy products (mainly cheese and yogurt), and limited intake of red meat. The primary sources of fat and alcohol in the MD are extra virgin olive oil and wine, which contain various bioactive phenolic compounds known for their significant anti-inflammatory properties. Consequently, the MD is rich in antioxidant and bioactive elements with anti-inflammatory effects and has a low glycemic index [17-19]. Numerous studies have indicated that low glycemic index foods play a protective role in acne vulgaris development, and the adoption of a Western lifestyle has been linked to an increased prevalence of acne vulgaris [1].

The findings of the present comparative trial underscore the intricate interplay between diet, specifically the MD, IGF-1 levels, and acne severity during treatment. The results underscore the significance of considering dietary patterns in conjunction with therapeutic interventions for acne management. This study not only reveals a statistically significant difference in IGF-1 serum levels between the MD-Group and the WD-Group, but also emphasizes the persistence of this difference in patients with severe acne who have undergone isotretinoin treatment. Isotretinoin, a retinol derivative widely used for severe acne treatment, proves highly effective despite some tolerable side effects. The results of our study suggest that the MD may enhance the efficacy of isotretinoin, indicating a potential synergistic effect. This underlines the importance of considering dietary patterns alongside therapeutic interventions in acne management. The observed impact of a MD on IGF-1 levels further reinforces the role of diet in hormonal balance, inflammation, and overall skin health, aligning with existing research in this field [2].

Conclusion

We hypothesize that MD may be the most suitable dietary regimen for individuals dealing with acne. Our theory centers on the observable impact of dietary patterns on the inflammatory severity of acne. Increased adherence to the MD appears to correlate with reduced acne severity, potentially providing a protective effect in acne pathogenesis. Furthermore, sticking to the MD seems crucial in speeding up the clearance of active lesions during treatment, consistently maintaining its effectiveness by lowering IGF-1 levels. Encouragingly, our findings support integrating dietary recommendations into the therapeutic approach for individuals with acne vulgaris, with the MD standing out as a particularly beneficial dietary pattern. The MD not only shows promise as a preventive measure to reduce acne incidence but also proves to be a valuable tool in enhancing the therapeutic outcomes of treatments used for this condition. This highlights the importance of incorporating dietary interventions as essential components of acne management strategies, offering a comprehensive approach to improve both prevention and treatment results.

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Ethical Considerations: the present study was approved by the local Ethics Committee.

Conflict of Interest: none declared.

References

1. Cordain L, Lindeberg S, Hurtado M, Hill K, Eaton SB, et al. (2002) Acne Vulgaris: A Disease of Western Civilization. Arch Dermatol 138: 1584-1590.
2. Melnik BC, Schmitz G (2009) Role of insulin, insulin-like growth factor-1, hyperglycaemic food and milk consumption in the pathogenesis of acne vulgaris. Exp Dermatol 18: 833-41.

3. Melnik B (2012) Dietary intervention in acne: Attenuation of increased mTORC1 signaling promoted by Western diet. Dermatoendocrinol 4: 20-32.

4. Babio Babio N, Bulló M, Basora J, et al. (2009) Adherence to the Mediterranean diet and risk of metabolic syndrome and its components. Nutr Metab Cardiovasc Dis 19: 563-570.

5. Tosti V, Bertozzi B, Fontana L (2018) Health Benefits of the Mediterranean Diet: Metabolic and Molecular Mechanisms. J Gerontol A Biol Sci Med Sci 73: 318-326.

6. Barrea L, Donnarumma M, Cacciapuoti S, et al. (2021) Phase angle and Mediterranean diet in patients with acne: Two easy tools for assessing the clinical severity of disease. J Transl Med 19: 171.

7. Kaaks R, Bellati C, Venturelli E, et al. (2003) Effects of dietary intervention on IGF-I and IGF-binding proteins, and related alterations in sex steroid metabolism: the Diet and Androgens (DIANA) Randomised Trial. Eur J Clin Nutr 57: 1079-1088.

8. Martínez-González MA, García-Arellano A, Toledo E, et al. (2012) A 14-item mediterranean diet assessment tool and obesity indexes among high-risk subjects: the PREDIMED trial. PLoS ONE 7: e43134.

9. Bertolani M, Rodighiero E, Saleri R, et al. (2021) The influence of Mediterranean diet in acne pathogenesis and the correlation with insulin-like growth factor-1 serum levels: Implications and results. Dermatol Reports 14: 9143.

10. Ah-Thiane L, Nguyen JM, Khammari A, Dréno B (2022) Lifestyle habits and impact of the Mediterranean diet on facial acne severity in French women: a case-control study. Int J Womens Dermatol 8: e017.

11. Lorite-Fuentes I, Montero-Vilchez T, Arias-Santiago S, Molina-Leyva A (2022) Potential Benefits of the Mediterranean Diet and Physical Activity in Patients with Hidradenitis Suppurativa: A Cross-Sectional Study in a Spanish Population. Nutrients 14: 551.

12. Doshi A, Zaheer A, Stiller MJ (1997) A comparison of current acne grading systems and proposal of a novel system. Int J Dermatol 36: 416-418.

13. Nast A, Dréno B, Bettoli V, et al. (2016) European evidence-based (S3) guideline for the treatment of acne - update 2016 - short version. J Eur Acad Dermatol Venereol 30: 1261-8.

14. Barrea L, Cacciapuoti S, Megna M, Megna M, Verde L, Marasca C, et al. (2024) The effect of the ketogenic diet on Acne: Could it be a therapeutic tool? Crit Rev Food Sci Nutr 34: 6850-6869.

15. Meixiong J, Ricco C, Vasavda C, Ho BK (2022) Diet and acne: A systematic review. JAAD Int 7: 95-112.

16. Ratnam AV, Jayaraju K (1979) Skin diseases in Zambia. Br J Dermatol 101: 449-453.

17. Davis C, Bryan J, Hodgson J, Murphy K (2015) Definition of the Mediterranean Diet; a Literature Review. Nutrients 7: 9139-53.

18. Mentella MC, Scaldaferri F, Ricci C, Gasbarrini A, Miggiano GAD (2019) Cancer and Mediterranean Diet: A Review. Nutrients 2019; 11: 2059.

19. Martínez-González MÁ, Hershey MS, Zazpe I, Trichopoulou A (2017) Transferability of the Mediterranean Diet to Non-Mediterranean Countries. What Is and What Is Not the Mediterranean Diet. Nutrients 9: 1226.