

Why don't we apply vitamin E to skin care?

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ABSTRACT

Objectives: Reviewing topical and systemic tocopherols as potential treatments for skin diseases in light of the extensive usage of vitamin E by patients.

Data sources: Index Medicus was searched for articles published between 1922—1966, the year vitamin E was discovered (the beginning of MEDLINE). We looked for papers on vitamin E or tocopherol in dermatology in both English and French in MEDLINE. From the review papers' reference lists, additional original articles were found.

Study choice: Anecdotes and open studies are cited for completeness and as guidance for future study; only well-designed controlled studies were approved.

Synthesis of data: There is some flimsy or conflicting evidence that vitamin E helps with collagen synthesis, wound healing, epidermolysis bullosa, cancer prevention, claudication, and yellow nail syndrome. It was useless for treating psoriasis, atopic dermatitis, dermatitis herpetiformis, subcorneal pustular dermatosis, porphyrias, and UV-induced skin damage.

Conclusions: There is still no evidence of vitamin E's usefulness in treating specific dermatologic disorders after 44 years of research. To further understand vitamin E's function, more study in carefully planned controlled studies is required.

INTRODUCTION

One young dermatologist inquired during a debate at the 195th Montreal Dermatological Society meeting: 'How come we don't use vitamin E? It is utilised by each and every patient, for everything.' However, a lot has been learned since one of us (R.R.F.) first studied with oc-tocopherol in the 1940s and found it to be of little utility. Consequently, the young dermatologist's casual query prompted this in-depth assessment of the literature.

When Long and Evans released a report on their investigation into the rat's estrous cycle in 1922, the history of vitamin E began. They had discovered that their rats' foetuses were being reabsorbed because something crucial was lacking from the meal they were feeding the animals. [2] That something was identified as vitamin (or factor) X in 1923 after being discovered in wheat germ oil. The vitamin was biochemically identified in 1936, and it was given the name tocopherol from the Greek words tocos (offspring) and phero (to bring forth). [5]

MATERIALS AND METHODS

We examined through MEDLINE for articles on vitamin E or tocopherol that had been written in both English and French, cross-referencing for phrases associated with dermatology. We also used Index Medicus because MEDLINE only goes back to 1966, which is barely a third as long as the history of vitamin E. Review articles that we came across throughout our search were used to determine where dermatologic references to vitamin E first appeared. We haven't cited the review papers here because they weren't considered primary sources. Only well planned controlled research were accepted as evidence; anecdotes and open studies are covered later.

Additionally, we only looked at studies that involved people (although some studies using animals and cell cultures are given for context). The lengthy history of uncertainty concerning vitamin E in the scientific literature can be attributed to two key factors.

One is that tocopherols do not have the same function in all mammalian species, unlike every other vitamin that is now known. For instance, a vitamin E shortage can result in cardiomyopathy in rabbits, hepatic necrosis in pigs, and bone-marrow failure in monkeys.[6] The second issue is that, despite vitamin E research dating back to the 1920s, the placebo-controlled, double-blind study was not firmly established as the only acceptable standard until the 1950s. Furthermore, as opposed to the absolute quantity of tocopherol, several experts believe that the ratio of tocopherol to plasma lipids is a better indicator of vitamin E status.[7]

Effects of vitamin E deficiency in humans

Most vitamin dosages are determined by the level at which a deficiency becomes clinically evident (e.g. from the Canadian Recommended Nutrient Intake⁸ or its US equivalent⁹). Volunteers are typically used in studies, and their diets are restricted until their body stores are depleted. The recommended intake for vitamin E, on the other hand, is based exclusively on an estimate of how much tocopherol the typical individual consumes (6 to 10 mg of α -tocopherol⁸ or the equivalent).¹⁰ One of the vitamins with the greatest distribution is vitamin E, which is found in most diets but is most abundant in vegetable oils. It would take around 4 years for a healthy adult who had been eating normally to completely exhaust their body's vitamin E reserves. Studies have been conducted in areas where the population is frequently undernourished. When Nadiger³ conducted a study in an Indian hamlet, he discovered 27 people who had phrynodema, a disorder typically linked to hypovitaminosis A and caused by low vitamin E levels. He explored treatment with both vitamin E and a vitamin B complex in his double-blind trial, in which a control group of 56 participants was matched with the 27 subjects for age and socioeconomic background. Both had some advantages, but vitamin E had a much greater advantage. Similar findings were made in a Sri Lankan community by Christiansen and colleagues [4].

Treatment of skin conditions

The illness known as yellow nail syndrome is thought to be brought on by a problem with lymphatic drainage from the fingers and toes. A first case report, followed by two open trials,

was presented "indicated that a viable treatment for this illness would be vitamin E. Williams, Buffham, and du Vivier⁸ recently reported the findings of a double-blind controlled trial that involved just one patient. Three of the patient's nails received treatment with vitamin E in dimethyl sulfoxide, whereas the remaining three nails received only dimethyl sulfoxide treatment. The clinical state of the treated nails significantly improved, according to the authors.

Vibration disease: This condition receives scant attention in Western literature and is primarily a dermatologist's concern. The effectiveness of vitamin E was investigated in a double-blind Japanese study on 60 chainsaw operators who had vibration disease. "Half of the participants received 1200 mg of dl- α -tocopherol nicotinate daily; after six weeks, it was discovered that the condition of those in the study group had greatly improved in all measures.

Dermatologists are interested in this issue because of the connection between ulcers and the vasculature. The effectiveness of vitamin E as a therapy for intermittent claudication has been shown to be controversial. The early (uncontrolled) experiments were conducted in the late 1940s; just one of them showed favourable outcomes. 45 Livingston and Jones 47 published encouraging findings from a double-blind trial including 34 patients in 1958. However, they quickly acknowledged that it was a tiny sample and that claudication is challenging to categorise and frequently improves on its own. Later investigations 4849, while not larger ones, revealed comparable advantages.

Cutaneous ulcers can be brought on by physical substances, anti-cancer medications, or other elements. The main focus has been on reversing or preventing damage caused by the extravasation of anticancer drugs, such as doxorubicin, aside from an early open investigation evaluating the effectiveness of topical vitamin E ointment in pressure sores [15], the results of which have never been verified. The estimated frequency of occurrences is between 0.5% and 6.0%. [16,17]

In multiple trials, it was discovered that either vitamin E or dimethyl sulfoxide, or both, had only a small impact on the extent of rats' experimentally generated skin ulcers. However, two of these investigations demonstrated that neither a regimen of vitamin E nor dimethyl sulfoxide was

helpful when doxorubicin was used at greater doses. 5060 Dorr and Alberts⁶ discovered no advantages at all in mice. Although difficult to set up, doubleblind controlled human trials are not impossible.

According to Ehrlich, Tarver, and Hunt, there was a decrease in wound healing associated with the reduction in collagen production, which was comparable to the effect of glucocorticoids. In accordance with this logic, Jenkins, Alexander, and MacMillan¹⁷ made an effort to employ steroids and vitamin E to lessen scarring during reconstructive surgery in burn patients. The comparison of the treatment and control groups revealed no differences.

Conditions for which vitamin E has been proven to be ineffective Atopic dermatitis is an idiopathic, recurring illness that is frequently difficult to cure. Surprisingly, it wasn't until 1989 that tocopherols were first mentioned as a potential treatment for atopic dermatitis.[21-23] In that year, Fairris and colleagues⁶⁸ conducted a randomised, double-blind trial on adult patients in which they used dietary supplements of selenium and vitamin E (both alone and together). Both substances had no impact.

Around the same time that atopic dermatitis was being studied, psoriasis was also a topic of study. A second double-blind study [19] attempting selenium and vitamin E was unsuccessful in demonstrating any advantage.

Some people feel that low glutathione levels are the cause of dermatitis herpetiformis. Selenium and vitamin E supplements were attempted by Ljunghall and associates [20], but they did not find any benefits.

Side effects

Almost all medications and substances have been linked to allergic contact dermatitis. Therefore, it is not surprising to find a number of cases of topical contact allergy to vitamin-E-containing products, including one erythema multiforme-like eruption and a positive patch test result. These are all unsubstantiated allegations, however in the controlled investigation of postoperative scarring¹⁷, about 20% of the patients described local responses to vitamin E cream.[24-26]

Systemic adverse effects are uncommon, and even these vary from report to report. Overall, one must concur with the finding that oral vitamin E therapy generally has a low incidence of adverse effects, as stated in Bendich and Machlin's outstanding reviews' [27-28]. Fisher's comment that vitamin E is bad for your pocketbook probably sums up the issue perfectly. People have not been discouraged from utilising it because there have been no major negative effects.

CONCLUSION

When tocopherols could be consistently demonstrated to be useful in dermatology was the response to the initial query. The research reveals some sporadic or contradictory evidence for the advantages of tocopherols in the treatment of cutaneous ulcers, claudication, epidermolysis bullosa, vibration illness, yellow nail condition, and cancer prevention. All of these could become future research topics. Furthermore, the numerous assertions indicated in Table I could be investigated in well planned investigations. Despite 44 years of research, there is still no evidence that the millions of dollars in vitamin E products that patients have paid for have been helpful.

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