lamp clearly seems to be an improvement over the previous equipment.

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REFERENCES

1. Larkö O. Phototherapy of psoriasis—clinical aspects and risk evaluation. Acta Derm Venereol (Stockh) 1982; Suppl 103.
2. Boer J, Schothorst AA, Suurmond D. UVB phototherapy of psoriasis. Dermatologica 1980; 161: 250–258.
3. Fischer T. UV-light treatment of psoriasis. Acta Derm Venereol (Stockh) 1976; 56: 473–479.
4. Fischer T, Alsins J, Berne B. Ultraviolet action spectrum and evaluation of ultraviolet lamps for psoriasis healing. Int J Dermatol 1984; 23: 633–637.
5. Parrish JA, Jaenicke KF. Action spectrum for therapy of psoriasis. J Invest Dermatol 1981; 76: 359–362.
6. van Weelden H, Baart de la Faille H, Young E, van der Leun JC. A new development in UVB phototherapy of psoriasis. Br J Dermatol 1988; 119: 11–19.
7. Karvonen J, Kokkonen E-L, Ruotsalainen E. 311 nm UVB lamps in the treatment of psoriasis with the Inram regimen. Acta Derm Venereol (Stockh) 1989; 69: 82–85.

The Effect on Atopic Dermatitis of Supplementation with Selenium and Vitamin E

G. M. FAIRRIS,[1] PAULINE J. PERKINS,[1] BARBARA LLOYD,[2] LESLEY HINKS[2] and BARBARA E CLAYTON[2]

[1]*Department of Dermatology, Royal South Hants Hospital, and* [2]*University Chemical Pathology and Human Metabolism, Southampton General Hospital, Southampton*

Reduced concentrations of selenium in whole blood, plasma and white cells and reduced activity of selenium-dependent glutathione peroxidase in red cells have been found in atopic dermatitis. To determine the effect of selenium supplementation on this disease, the normal daily diet of 60 adults with atopic dermatitis was supplemented with selenium-enriched yeast for 12 weeks in a randomised double-blind study. Group 1 took 600 μg of selenium alone, Group 2 600 μg of selenium plus 600 IU of vitamin E and Group 3 a placebo. After 12 weeks, there was a significant increase in the concentration of selenium in whole blood and the activity of selenium dependent glutathione peroxidase in platelets in Groups 1 and 2 and the concentration of vitamin E in plasma in Group 2. There was no significant difference between the three Groups in the severity of the eczema or the concentration of selenium either before or after the 12 weeks of supplementation. The results suggest that although selenium-enriched yeast supplement was absorbed and bioavailable it does not enter the skin or produces a worthwhile improvement in atopic dermatitis. *Key words: Eczema; Glutathione peroxidase.*

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G. M. Fairris, Department of Dermatology, Royal South Hants Hospital, Southampton.

Selenium is an essential trace element. It is part of the active site of the selenium-dependent enzyme glutathione peroxidase (EC 1.11.1.9) and so forms part of the body's antioxidant defences. A reduction in enzyme activity may lead to the accumulation of hydroxyl radicals in inflamed tissues (1) and supplementation with selenium has been shown to benefit patients with acne (2) and to reduce ultraviolet light induced inflammation in hairless mice (3). Vitamin E is another dietary antioxidant whose action complements that of selenium.

Reduced activity of glutathione peroxidase in red cells (4) and concentration of selenium in whole blood, plasma and white cells (5) have been found in atopic dermatitis and selenium concentrations are lower than adult values in childhood when atopic dermatitis is most prevalent and severe. In this study the effect of supplementation with selenium and vitamin E on adults with atopic dermatitis has been studied in a double blind placebo controlled study.

MATERIAL AND METHODS

Adults with moderate to severe atopic dermatitis were recruited from amongst those who had attended the Department of Dermatology in Southampton and their informed

consent obtained. Subjects were excluded who had taken diuretics or supplements containing selenium or vitamin E during the previous 12 months. The severity of each subjects' atopic dermatitis was determined by assessing separately on the head and neck, arms, trunk and legs the degree of inflammation, lichenification and scaliness on a scale from 0 to 4, adding the three values and multiplying them to produce a weighted total score. Before the supplements were taken, the mean score in the three groups was 21.0, 21.8 and 20.4, respectively. Venous blood was taken from each subject to measure the concentration of selenium in whole blood, vitamin E in plasma and the activity of glutathione peroxidase in platelets. In order to measure the concentration of selenium in skin, a sample of whole uninvolved skin, 6 mm in diameter, was excised from the lateral buttock using a biopsy punch and 2% lignocaine.

Using a set of random numbers, the patients were then allocated to one of the three Groups. Group 1 supplemented their normal diet with 600 μg daily of selenium in the form of selenium-enriched yeast (supplied by Wassen International Limited), Group 2 with 600 μg of the same selenium preparation plus 600 IU of vitamin E (d-alpha-tocopherol acetate) and Group 3 with visually identical placebo tablets. The study was designed to detect a 50% or greater improvement in atopic dermatitis and was carried out double-blind during the late winter and spring. The patients were allowed to apply 1% hydrocortisone ointment to their face and flexures and 0.05% clobetasone butyrate ointment or an equipotent preparation to other body sites during the study. Two patients could not be contacted after week 8. One patient was excluded at week 4 after changing her topical therapy and one at week 8 after taking unprescribed vitamins.

The supplements were taken each morning with food for twelve weeks. The patients were followed up 2, 4, 8 and 12 weeks after supplementation commenced and again 12 weeks after supplementation ceased. On each occasion, the severity of their atopic dermatitis was assessed and blood was taken to repeat the baseline measurements. To minimise discomfort, the skin biopsy was not repeated until the end of week 12 and was taken from an uninvolved site adjacent to the scar of the first biopsy.

Samples of whole blood, red cells, plasma, platelets and white cells were stored at −20°C until analysed and the activity of glutathione peroxidase and the concentration of vitamin E were always assayed within two weeks of venesection. Selenium was measured using hydride generation and atomic absorption spectroscopy (6) and the method was adapted and validated for use with samples of skin (7). The activity of glutathione peroxidase was determined using butyl hydroperoxide as the substrate (8), the concentration of vitamin E was measured by high pressure liquid chromatography (9) and protein by the Lowry method (10). The overall interbatch precision of measurements for selenium was less than 7%, for vitamin E 3.4% and for glutathione peroxidase activity 9.2%. The Student *t*-test was used to analyse the data.

RESULTS

Before supplementation started, the mean concentration of selenium in the patients' whole blood (1.36 μmol/l) was near the lower end of the reference range for Southampton (1.28–2.23 μmol/l) (11) but the mean concentration of vitamin E in plasma (20.3 μmol/l) was in the middle of the local reference range (12–36 μmol/l) (12). No correlation was found between the severity of the patients' atopic dermatitis and whole blood selenium concentrations.

After 2 weeks' supplementation there was a significant rise in the mean activity of glutathione peroxidase in platelets in Groups 1 and 2 (Fig. 1 *a*) and in the concentration of vitamin E in plasma in Group 2 (Fig. 1 *b*). After 4 weeks' supplementation the rise in the concentration of selenium in whole blood became significant in Groups 1 and 2 (Fig. 1 *c*). Even after 12 weeks' supplementation there was no significant difference between the mean severity score in the three groups at 13.7, 15.3, 14.5, respectively. The mean concentration of selenium in skin remained unchanged during supplementation (range of means 4.4–4.7 nmol/g dry weight). Twelve weeks after supplementation had ceased all the measurements in Groups 1 and 2 had returned to the baseline.

DISCUSSION

This study showed that supplementing the normal diets of adults suffering from atopic dermatitis with selenium and vitamin E produced a significant increase in the concentration of selenium in whole blood, vitamin E in plasma and the activity of glutathione peroxidase in platelets but did not improve their eczema or increase the concentration of selenium in skin. As previously reported (4, 5), the concentration of selenium in the patients' whole blood was reduced before supplementation.

The measurements showed that the supplements were both absorbed and bioavailable but, despite receiving three times the maximum recommended daily allowance of selenium and a large supplement of vitamin E there was no improvement in the patients atopic dermatitis. The selenium in the selenium-enriched yeast supplements is bound to aminoacids and it is possible that an unbound form like sodium selenite may enter the skin and prove more effective.

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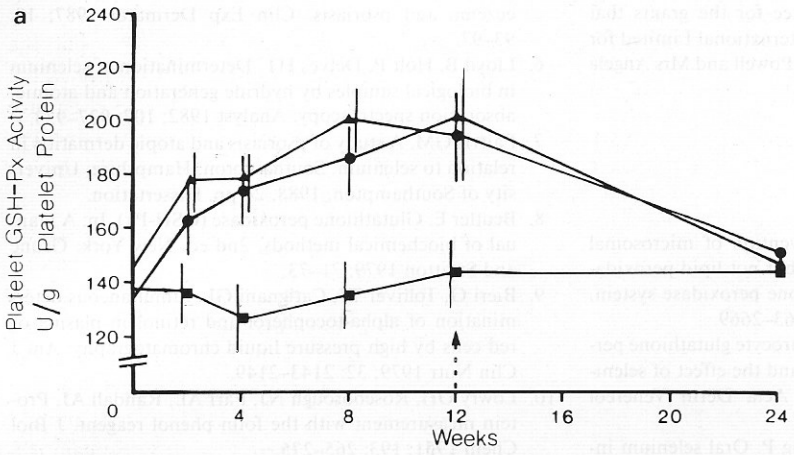

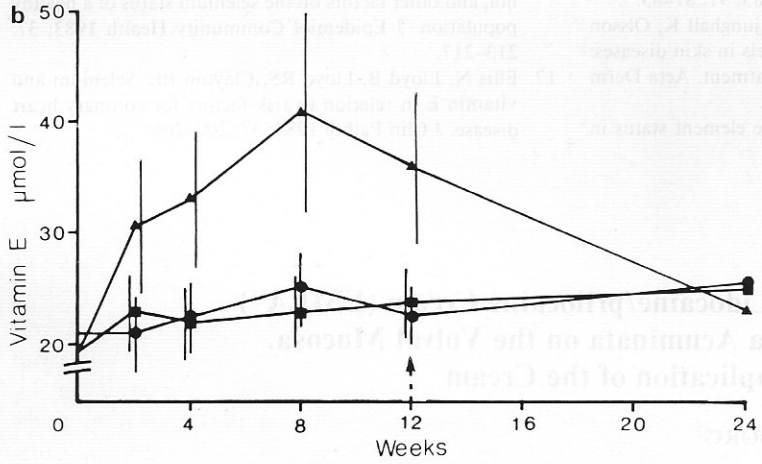

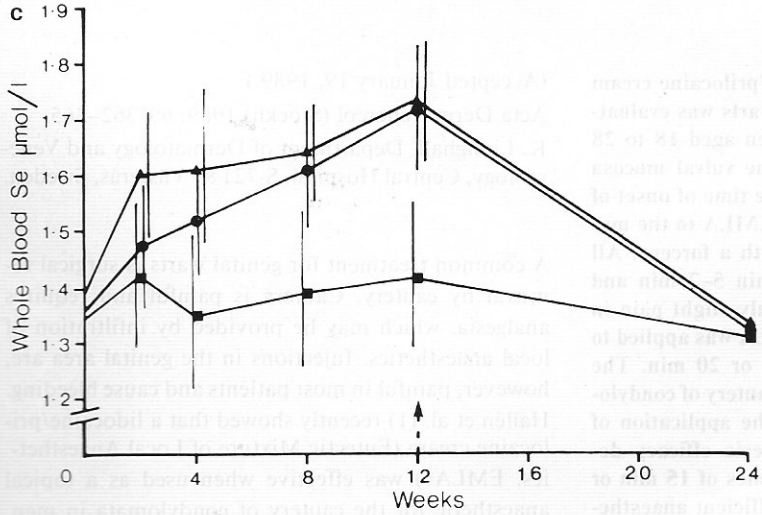

Figs. 1 a–c. Changes in selenium, vitamin E and glutathione peroxidase activity during and after supplementation (mean ± 95% confidence intervals). Group 1: ●, selenium-enriched yeast. Group 2: ▲, selenium-enriched yeast plus vitamin E. Group 3: ■, placebo. ↑ Supplementation ceased.

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REFERENCES

1. Beloqui O, Cederbaum AI. Prevention of microsomal production of hydroxyl radicals, but not lipid peroxidation, by the glutathione–glutathione peroxidase system. Biochem Pharmacol 1986; 35: 2663–2669.
2. Michaëlsson G, Edqvist LE. Erythrocyte glutathione peroxidase activity in acne vulgaris and the effect of selenium and vitamin E treatment. Acta Derm Venereol (Stockh) 1984; 64: 9–14.
3. Thorling EB, Overvad K, Bjerring P. Oral selenium inhibits skin reactions to UV light in hairless mice. Acta Pathol Microbiol Immunol Scand 1983; 91: 81–83.
4. Juhlin L, Edqvist LE, Ekman LG, Ljunghall K, Olsson M. Blood glutathione peroxidase levels in skin diseases: effect of selenium and vitamin E treatment. Acta Derm Venereol (Stockh) 1982; 62: 211–214.
5. Hinks LJ, Young S, Clayton B. Trace element status in eczema and psoriasis. Clin Exp Dermatol 1987; 12: 93–97.
6. Lloyd B, Holt P, Delves HT. Determination of selenium in biological samples by hydride generation and atomic-absorption spectroscopy. Analyst 1982; 107: 927–933.
7. Fairris GM. A study of psoriasis and atopic dermatitis in relation to selenium. Southampton, Hampshire: University of Southampton, 1988. 24 pp. Dissertation.
8. Beutler E. Glutathione peroxidase (GSH-Px). In: A manual of biochemical methods, 2nd ed. New York: Grune and Stratton 1979: 71–73.
9. Bieri G, Tolliver TJ, Catignani GL. Simultaneous determination of alpha-tocopherol and retinol in plasma or red cells by high pressure liquid chromatography. Am J Clin Nutr 1979; 32: 2143–2149.
10. Lowry OH, Roseborough NJ, Farr AL, Randall AJ. Protein measurement with the folin phenol reagent. J Biol Chem 1951; 193: 265–275.
11. Lloyd B, Lloyd RS, Clayton B. Effect of smoking, alcohol, and other factors on the selenium status of a healthy population. J Epidemiol Community Health 1983; 37: 213–217.
12. Ellis N, Lloyd B, Lloyd RS, Clayton BE. Selenium and vitamin E in relation to risk factors for coronary heart disease. J Clin Pathol 1984; 37: 200–206.

Local Anaesthesia with a Lidocaine/prilocaine Cream (EMLA®) for Cautery of Condylomata Acuminata on the Vulval Mucosa. The Effect of Timing of Application of the Cream

K. LJUNGHALL[1] and S. LILLIEBORG[2]

[1]*Department of Dermatology and Venereology, University Hospital, Uppsala, and* [2]*Clinical Research, Astra Pain Control, Södertälje, Sweden*

The analgesic efficacy of a lidocaine/prilocaine cream (EMLA®) for the cautery of genital warts was evaluated in an open study. Fifty-two women aged 18 to 28 with at least two condylomata on the vulval mucosa took part. In a pilot study ($n=10$) the time of onset of anaesthesia after the application of EMLA to the mucosa was established by pinching with a forceps. All ten patients were anaesthetized within 5–7 min and cautery was performed with no or only slight pain in 9/10 patients. In the main study EMLA was applied to the mucosa of 42 women for 10, 15 or 20 min. The anaesthesia was satisfactory for the cautery of condylomata in 92% of the patients after the application of EMLA for 10 minutes. The analgesic efficacy decreased gradually with application times of 15 min or longer ($p<0.05$). In the case of insufficient anaesthesia, an additional application of EMLA for 2–5 min enabled the operations to be completed in 7/8 patients.

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K. Ljunghall, Department of Dermatology and Venereology, Central Hospital, S-721 89 Västerås, Sweden.

A common treatment for genital warts is surgical removal by cautery. Cautery is painful and requires analgesia, which may be provided by infiltration of local anaesthetics. Injections in the genital area are, however, painful in most patients and cause bleeding. Hallén et al. (1) recently showed that a lidocaine/prilocaine cream (Eutectic Mixture of Local Anaesthetics, EMLA®) was effective when used as a topical anaesthetic for the cautery of condylomata in men, whereas this was the case in only 40% of the women investigated. The results suggested that the applica-