

ORIGINAL RESEARCH COMMUNICATION

Trace element supplementation after major burns modulates antioxidant status and clinical course by way of increased tissue trace element concentrations^{1, 2, 3}

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Background: After major burns, patients can develop nutritional deficiencies including trace element (TE) deficiencies. Various complications, such as infections and delayed wound healing, influence the clinical course of such patients.

Objectives: We aimed to investigate the effects of large, intravenous doses of TE supplements on circulating and cutaneous TE tissue concentrations, on antioxidant status, and on clinical outcome after major burns.

Design: This was a prospective, randomized, placebo-controlled trial in 21 patients aged 35 ± 11 y ($\bar{x} \pm$ SD) with burns on $45 \pm 21\%$ of their body surface area. Intravenous copper, selenium, and zinc (TE group) or vehicle (V group) was given with a saline solution for 14–21 d. Blood and urine samples were collected until day 20, and skin biopsy specimens were collected on days 3, 10, and 20.

Results: The age of the patients and the severity of their burns did not differ significantly between the groups. Plasma TE concentrations were significantly higher in the TE group. In burned areas, skin contents of both selenium ($P = 0.05$) and zinc ($P = 0.04$) increased significantly by day 20. Plasma and tissue antioxidant status was improved by supplementation. The number of infections in the first 30 d was significantly lower in the TE group ($P = 0.015$), with a median number of 2 versus 4 infections per patient in the TE and V groups, respectively, as a result of a reduction in pulmonary infections ($P = 0.03$). Wound healing was improved in the TE group, with lower requirements for regrafting ($P = 0.02$).

Conclusions: TE supplementation was associated with higher circulating plasma and skin tissue contents of selenium and zinc and improved antioxidant status. These changes were associated with improved clinical outcome, including fewer pulmonary infections and better wound healing.

Key Words: Critical illness • burns • supplementation • infection • deficiency • requirements • trace elements

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