

Abstract

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Reactive oxygen species, antioxidant mechanisms and serum cytokine levels in cancer patients: impact of an antioxidant treatment.

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OBJECTIVE: So far, it is not well established whether oxidative stress found in cancer patients results from an increased production of oxidants in the body or from a failure of physiological antioxidant systems. To further investigate this question we have assessed the blood levels of reactive oxygen species as a marker of free radicals producing oxidative stress and the most relevant of the physiological body enzymes counteracting reactive oxygen species, namely glutathione peroxidase and superoxide dismutase. Serum levels of proinflammatory cytokines and IL-2 were also investigated. All these parameters were studied in relation to the clinically most important index of disease progression, namely Performance Status (ECOG PS). We also tested the reducing ability of different antioxidant agents on reactive oxygen species levels by measuring the increase in glutathione peroxidase activity, and the reduction of serum levels of IL-6 and TNF.

DESIGN, SETTING AND SUBJECTS: We carried out an open non randomized study on 28 advanced stage cancer patients (stage III, 10.7%, and stage IV, 89.3%) with tumours at different (8) sites: all were hospitalized in the Medical Oncology Dept, University of Cagliari Interventions. The patients were divided into 5 groups and a different antioxidant treatment was administered to each group. The selected antioxidants were: alpha lipoic acid 200 mg/day orally, N-acetylcysteine 1800 mg/day i.v. or carboxycysteine-lysine salt 2.7 g/day orally, amifostine 375 mg/day i.v., reduced glutathione 600 mg/day i.v., vitamin A 30000 IU/day orally plus vitamin E 70 mg/day orally plus Vitamin C 500 mg/day orally. The antioxidant treatment was administered for 10 consecutive days.

RESULTS: Our results show that all but one of the antioxidants tested were effective in reducing reactive oxygen species levels and 2 of them (cysteine-containing compounds and amifostine) had the additional effect of increasing glutathione peroxidase activity. Comprehensively, the "antioxidant treatment" was found to have an effect both on reactive oxygen species levels and glutathione peroxidase activity. The antioxidant treatment also reduced serum levels of IL-6 and TNF. Patients in both ECOG PS 0-1 and ECOG PS 2-3 responded to antioxidant treatment.

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