Oral presentation

Phytochemical antioxidants and their impact on the toxicity and effectiveness of cancer chemotherapy: a systematic review of the evidence from randomized controlled trials

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Introduction. Botanicals are a rich source of various antioxidant compounds that can act as scavengers of free radicals in the body. Many studies have touted the benefits of antioxidants from both foods and supplements such as cruciferous vegetables, alliums, green tea, turmeric, oregano, etc., on different diseases. In the area of cancer, antioxidants are a much-debated topic when given concomitantly with certain chemotherapies. These particular chemotherapy drugs create free radicals as part of their mechanism of action against cancer cells. Some have argued that antioxidants scavenge the reactive oxygen species integral to the activity of certain chemotherapy drugs, thereby diminishing treatment efficacy. Others suggest antioxidants may either mitigate toxicity resulting from chemotherapy or even act synergistically with chemotherapy, thereby making the treatment more effective. Studies included in this review report on the impact of phytochemical antioxidants on either toxic side effects or survival/tumor response in patients.

Objectives. The objective of this study is to systematically review the medical literature to compile results from randomized, controlled clinical trials evaluating the effects of concurrent use of phytochemical antioxidants with chemotherapy.

Methods. We performed a search of literature from 1966-December 2006 using MEDLINE, Cochrane, CinAhl, AMED, AltHealthWatch and EMBASE databases. Randomized, controlled clinical trials reporting mitigation of chemotherapy toxicity or survival/tumor response were included in the final tally. The searches were performed in duplicate following a standardized protocol. No meta-analysis was performed due to heterogeneity of cancers and chemotherapy regimens.

Results. Of 848 articles considered, 32 trials met the inclusion criteria (19 reporting on both survival/tumor response and toxicity, 11 reporting only on toxicity and 2 reporting only on survival/tumor response). Phytochemical antioxidants evaluated were: glutathione (7), melatonin (4), vitamin A (2), an antioxidant mixture (2), vitamin C (1), N-acetylcysteine (1), vitamin E (1) and ellagic acid (1). Subjects of most studies had advanced or relapsed disease.

Conclusion. None of the trials reported evidence of significant decreases in efficacy from antioxidant supplementation during chemotherapy. On the contrary, many of the studies indicated that antioxidant supplementation resulted in either increased survival times, increased tumor responses, or both, as well as fewer toxicities than controls; however, lack of adequate statistical power was a consistent limitation. Phytochemical antioxidants thus have potential as a safe and inexpensive adjuvant to reduce toxicities resulting from chemotherapy, enabling patients to receive optimal doses and full courses of chemotherapy, with possible improvements in survival. Larger, well-designed studies of antioxidant supplementation concurrent with chemotherapy treatment are thus warranted.

Keywords: Adjuvant therapy; supplements; cancer treatment; complementary medicine; alternative medicine

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