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CONJOINT USE OF LAETRILE AND MEGADOSES OF ASCORBIC ACID IN CANCER TREATMENT: POSSIBLE SIDE EFFECTS

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ABSTRACT

Individuals who have a reduced capacity to detoxify cyanide to thiocyanate are at increased risk to experience adverse side effects from laetrile, a cyanide containing substance used in cancer treatment. Since megadoses of ascorbic acid may markedly diminish body stores of cysteine, a sulfur containing amino acid which facilitates the detoxification of cyanide, it is predicted that persons consuming megadoses of ascorbic acid will be at increased risk to experience the adverse side effects from laetrile treatment.

Key Words: laetrile, cancer, cancer treatment, cyanide, ascorbic acid

INTRODUCTION

In a recent article Calabrese (1) has hypothesized that individuals with reduced capacity to detoxify cyanide because of either a genetic predisposition or because of diets inadequate in sulfur-containing amino acids such as cysteine are at increased risk of developing adverse side effects from laetrile, a cyanide-containing substance, the use of which is now widely debated as a potential chemical treatment for cancer. Another highly debatable therapeutic treatment for cancer is that of megadoses of ascorbic acid as recommended by Pauling and his associates (2,3).

The conjoint use of laetrile and megadoses of ascorbic acid has not been formally proposed by any of the leading advocates of either treatment, but it would not appear as if the use of either is exclusive of the other. Since both treatments may be politely viewed as anti-establishment therapies, it would not be unexpected that individuals unsuccessfully treated via traditional means may seek treatment from both approaches simultaneously, especially given the desperate state of many such persons.[a]

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[a] In fact, in Massachusetts parents of a leukemic child have tried to obtain legal permission to have their afflicted child treated with laetrile plus a series of vitamin supplements including ascorbic acid instead of traditional chemotherapy treatments (4).

This paper hypothesizes that individuals exposed to megadoses of ascorbic acid will become predisposed to experiencing adverse cyanide related side effects of laetrile treatment.

Development of theory

In 1977 Basu (5) first suggested that megadoses of ascorbic acid (3 g/day) may enhance cyanide toxicity. This hypothesis was based on several earlier studies which revealed that ascorbic acid is metabolized to a certain extent to ascorbic acid sulphate (6) and that the metabolism of ascorbic acid may out compete other foreign compounds (e.g. salicylanide) for sulfur conjugation (7). Based on these studies Basu (5) evaluated the influence of megadoses of ascorbic acid in human subjects on the urinary excretion levels of cysteine because it may function as a sulphate donor during the metabolism of ascorbic acid and thiocyanate where cysteine acts as a sulphate donor.

He found that the daily application of 3 g of ascorbic acid for five weeks in six healthy male subjects (23-64 years) markedly reduced both cysteine and thiocyanate levels in the urine. In fact, by the end of the first week of treatment the levels of cysteine and thiocyanate had decreased by 35 percent and 39 percent, respectively, and after three weeks by 49 percent and 54 percent, respectively. The values of cysteine and thiocyanate continued to decrease but only slightly over the next two weeks.

Basu (1977) stated that megadoses of ascorbic acid may frequently be employed in diseases such as the common cold and cancer. He suggested that these ill persons may unknowingly be depleting nutritional substrates which may be playing important roles in normal physiological functions as well as in drug detoxication. Since thiocyanate is the most important detoxication product of cyanide (8), it is logical to assume that if large doses of ascorbic acid diminish the levels of available cysteine and formation of thiocyanate then the capacity to detoxify elevated levels of cyanid may be markedly diminished.

The data of Basu (5) offer important implications for those persons undergoing treatment with the controversial anticancer agent laetrile. The possible active agent within laetrile is cyanide and the occurrence of adverse side effects related to laetrile can be generally explained by the known toxic properties of cyanide (1). If the terminally ill cancer patient is also provided with megadoses of ascorbic acid (as have been supported by clinical findings of Cameron and Campbell (2)) and is treated with laetrile, it is predicted that such a patient may be at increased risk to experiencing cyanide induced side effects (of laetrile treatment).

Future research

It would seem that re-examination of the health studies of patients who have taken laetrile should be made, carefully observing for differences in dietary

intakes of ascorbic acid. It would, of course, be predicted that a higher incidence of patients with symptoms of cyanide toxicity should be amongst those patients who have taken very large doses of ascorbic acid (assuming all other influential factors being equal). However, this hypothesis should be investigated prospectively as well since data on dietary history may not be accurately quantified especially including how much the person actually eat.

A dose-response relationship should be developed with respect to the influence of ascorbic acid on cysteine and thiocyanate excretion. For example, would 150 mg/day affect cysteine levels? Finally, evaluation of the hypothesis that megadoses of ascorbic acid enhance cyanide toxicity should be conducted with an appropriate animal model.

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