Intravenous Vitamin C (Ascorbic Acid): Information for Physicians and Patients

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Intravenously administered high dose ascorbic acid (HDIVC) as used in cases of patients with cancer has considerable mythology surrounding it. The purpose of this review is not to exhaustively recap the data regarding this therapy but rather to address basic issues of safety, pharmacology and outcomes of ongoing research.

Safety:

Paramount in the decision to include a particular therapy for any condition is the safety of that treatment. The bottom line with respect to HDIVC is that in properly screened patients it is an extremely safe intervention. In a 2010 review (4) there were five reported serious adverse events in the literature. Of these one was hemolysis in a patient with G6PD deficiency (G6PD is an enzyme used in red blood cells to reduce hydrogen peroxide to water) and the balance were renal complications (in patients with preexisting renal disease or insufficiency).

All patients are pre-screened for multiple conditions prior to any HDIVC, and particular attention is paid to G6PD status, renal function and other co-morbidities. Deficient G6PD and renal insufficiency are contraindications for HDIVC.

In a review of the five cases mentioned, all could have been prevented with proper screening as recommended in current protocols.

Pharmacology:

The major concept behind HDIVC and cancer is that it is used as a pro-drug for the production of hydrogen peroxide in the extracellular space, thus potentially damaging the cancer cells (4). Is there any evidence of this potential? First, orally administered vitamin C is unable to create a plasma level high enough to create any substantial peroxide formation (1,5). Second, it has been demonstrated that HDIVC properly dosed can create the type of peroxide surge in the extracellular space required to potentially damage cancer cells (5). Finally it has been shown that some cancer cells have decreased ability to defend against the peroxide, where normal human cells can reduce the peroxide to water (1) – making HDIVC a potential anti-cancer pro-drug.

Our protocols are designed to ensure safety first. They are followed by measurement of post-HDIVC blood ascorbate levels to assure the effective peroxide forming dose for each patient.

HDIVC and Other Chemotherapeutic Agents:

A great deal of confusing information regarding the appropriate place and timing for the administration of HDIVC with other chemotherapeutic agents exists. Currently an up to date review of all available data in this arena is being completed by the author. A quote from a recent peer reviewed publication reveals the overall direction the data are pointing: “Clinical investigation of pharmacologic ascorbate should be considered as an addition to existing cancer treatments. Its mechanism of action as a pro-drug for H2O2 generation is distinct from most currently used agents. For this reason, there is potential for synergy, or at least an additive effect, in combination with other drugs. This strategy is similar to that used for treatment of many cancers, tuberculosis, serious bacterial infections, hepatitis, and HIV. Emerging data indicate that there are additive effects of ascorbate with other neoplastic agents” (11). A review of available data in 2008 summarized multiple existing cancer therapies and their effect in combination with ascorbate and found all agents either not affected or enhanced by ascorbate (9). This review had one exception which was the agent bortezomib, but later clinical data showed that even this agent had synergistic effect with HDIVC (10). More study needs to be done, but data published between late 2011 and 2012 also reveal only positive additive effects using HDIVC in combination with existing cancer treatments (7).

Ongoing Research:

Published reviews of HDIVC agree that there is limited data to support or to disprove the efficacy of this intervention in cancer patients (1,3,4,5). These authors agree that more data needs to be collected in order to verify the use of this intervention for cancer patients. In addition to many anecdotal reports regarding the positive benefits of HDIVC in cancer situations (4), two recent presentations reported a 50% positive outcome in a small sample of stage 4 cancer patients following data over a 2.5 year timeframe (6,7).

While we have no conclusive outcomes data as yet regarding the success rate of HDIVC, it is viewed as a safe and potentially effective treatment in a medically supervised environment.

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