

Ascorbic Acid in Cardiovascular Disorders

Clinical Discussion and Literature Review: © PS Anderson – www.ConsultDrA.com 2017

Review and Discussion:

Ascorbic Acid (Vitamin C) is seemingly so ubiquitous an intervention in integrative healthcare it is easy to overlook its potential therapeutic benefit as well as economical cost profile when considering therapies. One therapeutic target that is both common and also often filled with costly interventions is cardiovascular prevention and disease. All the common natural interventions are necessary and generally worth the cost. This paper and the other noted below reminded me personally of the profound benefit vitamin C can add to cardiovascular prevention and therapy.

In this study [1] the authors set up the intervention with the following description: “Percutaneous coronary angioplasty (PCA) has been demonstrated to reduce mortality and morbidity and thereby improve the prognosis of patients undergoing acute myocardial infarctions (AMIs). However, this procedure paradoxically increases the initial damage as the result of a condition known as 'myocardial reperfusion injury'. Oxidative stress may contribute to the mechanism of this injury. The goal of the present study was to ascertain whether high plasma ascorbate levels could ameliorate the reperfusion injuries that occur after the successful restoration of blood flow.”

As a model of cardiovascular disease AMI, PCA and reperfusion injury is both easily studied as well as an excellent set of markers for general cardiovascular effect of an intervention. In this study the simple and inexpensive intervention (vitamin C) showed objective improvement in these parameters when low ascorbate versus high ascorbate levels were compared: “These data are consistent with the protective effect of high plasma levels of ascorbate against the oxidative challenge caused by reperfusion injury in patients subjected to PCA following an AMI.”

What was the intervention to gain the therapeutic benefit? An initial loading dose of vitamin C using an infusion was followed by oral treatment with vitamin C (500 mg/12 hours) plus vitamin E (400 IU/day) for 84 days. Obviously the tocopherol is synergistic with the vitamin C [2] but the fact that the measured parameter of high versus low plasma ascorbate showed correlation to clinical effect supports the vitamin C as a beneficial intervention.

A logical question is “with the intervention started with an infusion of vitamin C can we gain these benefits with oral dosing alone?” This question came to me as I read the study and can be simply answered. There is the chance that in the acute setting (such as was used for this trial) an immediate infusion of vitamin C could add some benefit as a loading dose. That cannot be excluded as a possibility. But in general in the setting of pathology and certainly in the setting of prevention oral vitamin C is sufficient to keep plasma levels in these ranges. The intervention dose of 500 mg every 12 hours was certainly conservative and very achievable in almost any patient setting. As mentioned the addition of tocopherols at low dose are appropriate as synergist.

Can vitamin C aid cardiovascular health in other ways? There are many mechanisms by which maintaining these plasma levels of vitamin C can be beneficial. Of these one is platelet activation modulation and in cell studies vitamin C has been shown to decrease platelet adhesion, another trigger of cardiovascular pathology. [3]

Clinical Tips:

In clinical practice I employ this information in the following manner (all include normal healthy diet, lifestyle and other nutrient basics as indicated):

General prevention:

Vitamin C 500 to 1500 mg twice a day with food

Vitamin E (as mixed Tocopherols 400 IU or Tocotrienols at 150-300 mg) once a day

* IV Vitamin C, 12.5 – 25 grams as a loading dose, one to four infusions.

Therapeutic use before and after cardiovascular events or procedures:

Vitamin C 1000 to 1500 mg three times a day with food

Vitamin E (as mixed Tocopherols 400 IU or Tocotrienols at 150-300 mg) twice a day

* IV Vitamin C, 12.5 – 25 grams, twice weekly before and once weekly after procedure

Note: This therapeutic use is intended for up to eight weeks prior to (if possible) and twelve weeks following the procedure or event. Then preventive doses can be used. Also if using these doses prior to

an interventional procedure (stent placement, surgery etc.) these nutrients should be discontinued five to seven days prior to the procedure and re-started as soon after the procedure as possible.

While there are many excellent supplements to employ in the care and prevention of cardiovascular disease it is good to be reminded that from both a basic science perspective as well as a human clinical research basis that simple and low cost interventions such as vitamin C can be so powerful. It is also helpful to have a low cost base intervention to use in the setting of those with low income and resources to deploy in their healthcare.

References:

1. Reviewed paper: Valls N, et al. Amelioration of persistent left ventricular function impairment through increased plasma ascorbate levels following myocardial infarction. Redox Rep. 2016. PMID 26066587
2. See “ReDox Biology” – ConsultDrA.com – Free Clinical Discussion and Research Review - “ReDox” – Our ever evolving understanding of oxidative balance, kinetics and implications in health and disease.
3. Secor D, et al. Ascorbate inhibits platelet-endothelial adhesion in an in-vitro model of sepsis via reduced endothelial surface P-selectin expression. Blood Coagul Fibrinolysis. 2016. PMID 26829365