ALTERNATIVE CANCER SOLUTION

INSTITUTE FOR HEALTHY AGING

Cancer Therapy

Cancer Treatment and Alternative Therapy.
The History of Vitamin C

In the 1970s, Linus Pauling and his colleagues administered high dose vitamin C (10 grams per day intravenously, followed by at least 10 grams orally) to terminal cancer patients. This therapy was helpful in increasing survival time and improving quality of life.

Subsequent to Pauling's studies, two randomized placebo-controlled studies conducted at the Mayo clinic found no differences in outcome between terminal cancer patients receiving 10 grams per day orally or placebo. The obvious difference between the Mayo clinic studies and the Pauling studies, was that The Mayo clinic did not use intravenous vitamin C.

In the 1990s, Hugh Riordan, MD and colleagues demonstrated that most tumor cell types, when exposed to a vitamin C concentration of 400 mg/dl in a culture medium, quickly die, while normal cells remain unaffected. Concentrations such as listed above can only be achieved through intravenous administration.

In August of 2005, Mark Levine, MD and colleagues, from the National Institutes of Health, performed a study similar to that of Hugh Riordan. They took several different cancer cell lines as well as normal cells, and exposed them to vitamin C in a culture medium. Using vitamin C concentrations only achievable through intravenous administration, Dr. Levine found that 5 different cancer cell lines died, while normal cells were unaffected. The mechanism of death to cancer cells was high levels of intracellular hydrogen peroxide which were produced in response to the vitamin C.

Since the 1970s, many cancer patients have been treated with regular infusions of high dose intravenous vitamin C. Some patients have been reported to be cured, while some went on to live many years with their cancer. Unfortunately, there are no large randomized, placebo-controlled, double blind studies with IV vitamin C, as are done with all new FDA approved drugs. Most studies such as these are funded by large pharmaceutical companies. Vitamin C simply has not grabbed the attention of the pharmaceutical industry, because a patent cannot be obtained

on vitamins. There is little money to be made from large investments in vitamin research. Many of us are hopeful, however, that the study performed by Dr. Levine with the NIH will inspire a new avenue of research.

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Protocol for Vitamin C and other antioxidants at the Institute for Healthy Aging

Most cancer patients will require three intravenous infusions per week, at least for the first 1-2 months. This will require that you have an intravenous line placed (such as a PIC line or central line) that can remain for at least a few months.

At the Institute, our intravenous infusions consist of not only vitamin C, but also other antioxidants such as intravenous vitamin E, glutathione, and alpha lipoic acid. These antioxidants work synergistically and increase the effectiveness of vitamin C. Oral supplementation, especially between infusion days, has been found to be a very helpful adjunct to the intravenous infusions. The list of oral supplements can be significant and play an important role in successful cancer treatment.

Many Oncologists Recommend Avoiding Antioxidants during Chemotherapy or Radiation Therapy – Is there Validity to this Concern?

Radiation and many chemotherapy drugs kill cancer cells (and healthy cells) by causing oxidative stress, or free radicals. Antioxidants support the immune system by reducing free radicals. The concern that antioxidant therapy will undermine the effectiveness of chemo/radiation therapy is based on theory and conjecture rather than evidence. Interestingly, studies that have looked at the combination of therapies (chemotherapy and/or radiation in conjunction with antioxidants) reveal patients' survival was either the same or better than with traditional therapy alone, yet with less negative side effects. If your oncologist remains concerned regarding combining the two therapies, we would be happy to email him/her the literature.

Well documented cases of advanced cancers responding to intravenous vitamin C therapy

Early clinical studies showed that high-dose vitamin C, given by intravenous and oral routes, may improve symptoms and prolong life in patients with terminal cancer. Double-blind placebo-controlled studies of oral vitamin C therapy showed no benefit. Recent evidence shows that oral administration of the maximum tolerated dose of vitamin C (18 g/d) produces peak plasma concentrations of only 220 µmol/L, whereas intravenous administration of the same dose produces plasma concentrations about 25-fold higher. Larger doses (50–100 g) given intravenously may result in plasma concentrations of about 14 000 µmol/L. At concentrations above 1000 µmol/L, vitamin C is toxic to some cancer cells but not to normal cells in vitro. We found 3 well-documented cases of advanced cancers, confirmed by histopathologic review, where patients had unexpectedly long survival times after receiving high-dose intravenous vitamin C therapy. We examined clinical details of each case in accordance with National Cancer Institute (NCI) Best Case Series guidelines. Tumour pathology was verified by pathologists at the NCI who were unaware of diagnosis or treatment. In light of recent clinical pharmacokinetic findings and in vitro evidence of anti-tumour mechanisms, these case reports indicate that the role of high-dose intravenous vitamin C therapy in cancer treatment should be reassessed.

Thirty years ago Cameron, Campbell and Pauling reported beneficial effects of high-dose vitamin C (ascorbic acid) therapy for patients with terminal cancer.1–4 Subsequent double-blind, randomized clinical trials at the Mayo Clinic failed to show any benefit,5,6 and the role of vitamin C in cancer treatment was discarded by mainstream oncologists.7,8 Vitamin C continues, however, to be used as an alternative cancer therapy9,10

A key distinction between conventional, science-based medicine and alternative therapy is the presence or absence of scientific plausibility.11In conventional medicine, the efficacy of treatment is proven by properly conducted clinical trials. Many treatments are still used if there is moderately good, albeit inconclusive evidence of efficacy ("clinical plausibility"), especially when treatment rationale agrees with biologic facts (conferring "biological plausibility").11 Vitamin C is an alternative cancer therapy because the results obtained in original studies that

suggested clinical benefit were not confirmed by controlled clinical trials, and the notion that high-dose vitamin C was selectively toxic to cancer cells was biologically implausible.

New information is available pertaining to biological plausibility. Although similar doses of vitamin C were used in the Cameron–Pauling and Mayo Clinic studies, the Cameron–Pauling studies combined intravenous and oral administration whereas the Mayo Clinic studies used only oral administration.1,2,12–14 Recent pharmacokinetics modeling15indicates that with oral administration, even very large and frequent doses of vitamin C will increase plasma concentrations only modestly, from 70 µmol/L to a maximum of 220 µmol/L, whereas intravenous administration raises plasma concentrations as high as 14 000 µmol/L. Concentrations of 1000–5000 µmol/L are selectively cytotoxic to tumour cells in vitro,16–20and emerging evidence indicates that ascorbic acid at concentrations achieved only by the intravenous route may function as a pro-drug for hydrogen peroxide delivery to tissues.20 The in vitro biologic evidence and clinical pharmacokinetics data confer biological plausibility to the notion that vitamin C could affect cancer biology and may explain in part the negative results of the Mayo Clinic trials.13,15,21,22 Thus, sufficient evidence has accumulated, not to use vitamin C as cancer treatment, but to further explore the therapeutic concept. One way to increase the clinical plausibility of alternative cancer therapies is rigorous, well-documented case reporting, as laid out in the US National Cancer Institute (NCI) Best Case Series guidelines (http://www3.cancer.gov/occam/bestcase.html).23,24 Such case series might identify alternative therapies that merit further investigation.23,24.

Case reports of apparent responses by malignant disease to intravenous vitamin C therapy have appeared,25–30 including those of 2 of the 3 patients presented below.25,26 However, they were reported without sufficient detail or with incomplete follow-up for evaluation and without conforming to NCI Best Case Series guidelines. They also lacked objective pathologic confirmation, which is a pillar of NCI guidelines. In this article, we use NCI Best Case Series guidelines to report 3 cases of patients with usually progressive malignant disease who received intravenous vitamin C therapy as their only significant cancer therapy and whose clinical courses were unusually favourable. Original diagnostic material obtained before treatment with vitamin C was reviewed by pathologists at the National Institutes of Health (NIH) who were unaware of the diagnoses and treatments4.

Patient 1 Patient 2 Patient 3

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Intravenous Vitamin D2 Analogue

At the Institute, at the completion of each antioxidant infusion, we inject a vitamin D2 analogue called "paricalcitol." Paricalcitol has been shown to inhibit proliferation of myeloid leukemia, myeloma, and colon cancer cell lines by modulating cell cycle progression, differentiation, and apoptosis, as well as inducing expression of several tumor suppressor genes including PTEN and E-cadherin. Paricalcitol inhibited the in vivo growth of human colon cancer xenografts in nude mice. Tumors in paricalcitol-treated animals were smaller (P=0.03) and weighed less (P<0.001) than tumors in control-treated mice.

In addition, treating prostate cancer cells with paricalcitol made these cells more susceptible to the destructive effects of radiation therapy, without harming normal cells.

Because paricalcitol has very little calcemic activity, it can be given at higher doses than vitamin D3 without toxicity, potentially leading to greater efficacy in the treatment of vitamin D3-sensitive cancers. Research has shown that paricalcitol may be affective for many types of solid tumors; Roswell Park Cancer Institute is currently recruiting patients for enrollment in a clinical trial treating various solid tumors, as well as multiple myeloma with paricalcitol.

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Hormonal Therapy

Mainstream medicine is accustomed to using hormonal therapy primarily to treat hormone receptor positive breast cancer and prostate cancer. At the Institute we use aromatase inhibitors, such as arimidex to treat lung cancer.

Aromatase inhibitors inhibit the conversion of testosterone into estrogen. Estrogen has been shown to promote the growth of lung cancers, as revealed in the following article.
Click Here DECEMBER 15, 2005
Breast Cancer Drugs May Slow Growth of Lung Cancer

LHRH/Gonadotropin Releasing Hormone Agonists (GnRH agonists)

Aromatase Inhibitors
GnRH receptors/binding sites have found in hormine dependent tissue, such as breat, endometrial, ovarian, prostate, and recently, even in pancreatic (exocrine) tisse. Experimental and clinical studies have shown regression of cancer (including pancreatic) using GnRH agonists. At the Institute, we use GnRH when indicated.

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Octreotide (Somatostain Analogue)
Many cancer cells exhibit somatostatin receptors (SS-R). These receptors are anti-proliferative and therefore inhibit cancer growth. Unfourtunately, many cancers express an inverse relationship between SS-R and receptors for EGFR. In addition, many cancer cells overexpress IGF-1 receptors, which promote cancer proliferation. Somatostatin analogues inhibit IGF-1. Cancers that have adequate receptors for SS-R, or produce significant amounts of IGF-1, may show a response to treatment with injectable Octreotide, which is a somatostatin analogue. At the Institute, when indicated, we have the patients inject octreotide 3times/day.

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Matrix metalloproteinase inhibitor

Previous and ongoing studies have revealed that subantimicrobial doses of doxycycline inhibit the metastasis of cancer by acting as a broad matrix metalloproteinase inhibitor.Based on this data, each patient receives Doxycycline 20 mg 2 times per day.

Dopamine and Angiogenesis

Dopamine inhibits angiogenesis (development of new blood vessels for cancer growth) by biding to the D2 receptors of progenitor endothedial cells in the bone marrow. Based on this, each patient is placed on bromocriptine to inhibit metastasis.

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Carbogen and Vasodilation Therapy
Carbogen is a mixture of oxygen and carbon dioxide. Many studies have shown that using a mixture of 95% oxygen

with 5% carbon dioxide increases the blood flow to tumors, by dilating the tumor vessels. These studies have shown improved tumor uptake of chemotherapy as well as increased tumor responsiveness to radiation therapy while having the patients breathe carbogen.

One of the biggest, if not the primary obstacle to treating cancer is the fact that tumor blood flow is extremely poor. Intravenous chemotherapy will obviously be ineffective if the blood is not sufficiently perfusing the tumor. In addition, radiation therapy requires a well oxygenated tumor to have optimal destruction of tumor cells. Studies also reveal that poorly oxygenated tumors are more prone to metastasize, and are more prone to undergo angiogenesis (develop new blood vessels to feed itself). Several studies have also shown a positive correlation with the grade of the tumor and the oxygen status (the lower the partial pressure of oxygen in the tumor, the higher the grade off cancer).

In addition, certain drugs that cause tumor vessels to dilate have revealed improved tumor blood flow, and thereby increased responsiveness to treatment. One of the best dilators of tumor vessels is isosorbide dinitrate, a commonly used drug to treat angina.

At the Institute, we incorporate the use of both carbogen breathing and isosorbide dinitrate, while administering intravenous antioxidant therapy.

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Biography

Mark A Rosenberg, MD
Dr Rosenberg In The News

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