

CLINICAL RESEARCH

Intravenous Vitamin C as a Chemotherapy Agent: a Report on Clinical Cases

HUGH D. RIORDAN, Ph D*; NEIL H. RIORDAN, Ph D†; JAMES A. JACKSON*; JOSEPH J. CASCIARI*;
RON HUNNINGHAKE,‡; MICHAEL J. GONZÁLEZ, Ph D‡; EDNA M. MORA, MD‡;
JORGE R. MIRANDA-MASSARI, Pharm D‡; NORBERTO ROSARIO, ‡; ALFREDO RIVERA‡

A series of seven cases are presented in which intravenous vitamin C has been used as antineoplastic agent in the treatment of different types of cancers. The cancers cases reviewed are the following: Renal cell carcinoma (2), Colorectal cancer (1), Pancreatic cancer (1), Non-Hodgkin's lymphoma (2) and breast cancer

(1). Toxic reactions were not observed at these high doses of intravenous Vitamin C. All patients were prescreened for Glucose 6 – phosphate dehydrogenase deficiency before administering intravenous Vitamin C in order to prevent hemolysis.

Key words: Cancer, Vitamin C, Humans

This is a clinical report of seven cases of cancer patients receiving iv vitamin C alone or in combination with conventional therapy. The cancers cases reviewed were. Renal cell carcinoma, colorectal cancer, pancreatic cancer, Non-Hodgkin's lymphoma and breast cancer.

Renal Cell Carcinoma Cases

Positive effects of IV vitamin C therapy in a patient with adenocarcinoma of the kidney were reported in 1990 by one of the authors (HDR) (1). This report described a 70-year old white male, diagnosed with adenocarcinoma of his right kidney. Shortly after right nephrectomy, he developed metastatic lesions in the liver and lung. The patient began intravenous vitamin C treatments, starting at 30 grams twice per week. Six weeks after initiation of therapy, reports indicated that the patient was feeling well, his exam was normal, and his metastases were shrinking. Fifteen months after initial therapy, the patient's oncologist reported that the patient was feeling well with absolutely no signs of progressive cancer. The patient remained

cancer-free for 14 years. He died of congestive heart failure at the age of 84.

A second case study, published in 1998 (2), described another complete remission in a patient with metastatic renal cell carcinoma. The patient, was a 52-year old white female from Wisconsin diagnosed with non-metastatic disease in September 1995. In October 1996, eight metastatic lung lesions were found: seven in the right lung and one in the left (measuring between 1-3cm). The patient chose not to undergo chemotherapy or radiation treatments. The patient was started on intravenous vitamin C along with oral nutritional supplements to correct diagnosed deficiencies and a broad-spectrum oral nutritional supplement in October, 1996. The initial dose of intravenous vitamin C 15 grams, subsequently increased to 65 grams after two weeks. The patient was given two infusions per week. Intravenous vitamin C treatments were continued until June 6, 1997. An X-ray taken at the time revealed resolution of all lung metastases, but one. The patient discontinued intravenous vitamin C infusions at that time and continued taking the broad-spectrum oral nutritional supplement. A radiology report on a chest X-ray taken January 15, 1998, stated that no significant infiltrate was evident, and there was resolution of the upper lobe lung metastases. In February, 1999 a chest X-ray showed no lung masses and the patient reported being well at that time.

Vitamin C IV and Chemotherapy in Stage Colorectal Carcinoma

In April, 1997, a 51-year-old white male from Wichita, Kansas was first seen at our center. He was well other

From the *Center for the Improvement of Human Functioning, RENAC Project, Wichita, KS, †Aidan Incorp, Tempe, AZ, the ‡RECAC II Project, University of Puerto Rico, Medical Sciences Campus, the School of Public Health, Dept. of Human Development, Nutrition Program, the School of Medicine, Puerto Rico Cancer Center and Surgery Division, the School of Pharmacy, Dept. Pharmacy Practice, San Juan, PR, UPR, Rfo Piedras Campus, Medical Services, San Juan, PR and the Veterans Affairs

Address correspondence to: Dr. Michael J. González, University of Puerto Rico, Medical Sciences Campus, School of Public Health, Dept. Human Development, Nutrition Program, RENAC II Project, PO Box 365067, San Juan, and PR 00936-5067, Email: mgonzalez@rcm.upr.edu

than having type II diabetes until the previous fall when he developed painless bright red rectal bleeding. A work-up demonstrated the presence of a distal colon lesion. On December 31, 1997 he underwent an anterior colon resection and appendectomy at a local hospital. The colon tumor penetrated through the bowel wall and into the surrounding peri-colonic adipose tissue. Two large hepatic metastases were discovered at the time of surgery; one was biopsied. Pathology revealed that the colon lesion was a moderately differentiated adenocarcinoma, and the liver biopsy was metastatic adenocarcinoma. Following surgery he received chemotherapy with weekly 5-FU and Leucovorin for twelve cycles with a decrease in his CEA from 90.2 to 67.7. The patient and his wife asked the chemotherapist about getting intravenous vitamin C along with the chemotherapy. The oncologist assured them that vitamin C would not be of any value.

The patient was later evaluated at Pittsburg University Hospital on May, 1997 where he underwent liver resection to segments three and five. During surgery, the stomach was mobilized off the interior surface of the liver and a frozen section of this area was taken and confirmed metastatic adenocarcinoma. The pathology report showed metastatic carcinoma consistent with colon primary within the desmoplastic tissue and adjacent hepatic parenchyma from the stomach wall and liver. Segments three and five both contained multiple nodules. His CEA was 9.8 post-surgery; the Pittsburg University oncologists informed his prognosis was very poor and that he should go home and continue chemotherapy again. The patient again asked his oncologist if he should use intravenous vitamin C. He responded, "I know of no studies which showed that this (vitamin C) would eradicate or delay progression of cancer".

In spite of the two non-confidence recommendations for the use of intravenous vitamin C, he returned to our center for infusions after recovering from surgery in June 1997. He also began receiving weekly 5-FU (1,100 mg) and Leucovorin (1,300 mg) treatments administered by his local oncologist. His first vitamin C infusion was 15 grams over one hour. The dose was gradually increased during bi-weekly infusions. On September 9, 1997, a post-intravenous vitamin C (100 gram in 1,000 cc sterile water infused over 2 hours) plasma concentration of vitamin C was 355 mg/dl. He was then started on intravenous vitamin C, 100 grams, twice weekly. His wife, a registered nurse, gave most of these infusions at home. In addition to the vitamin C, he was given recommendations for oral vitamin and mineral supplementation to increase levels of nutrients that were found to be low.

He kept up his vitamin C infusions until February, 1998, when he traveled to Florida for a vacation. While on

vacation he continued the 5-FU/Leucovorin injections. After a two weeks hiatus from the vitamin C infusions, he began to experience nausea, diarrhea, stomach pain, and stomatitis; common side effects of 5-FU. Interestingly, the side effects ceased when he restarted intravenous vitamin C. He continued on chemotherapy and 100 gm Bi-weekly intravenous vitamin C until April 1, 1998. Other than the brief period of side-effects mentioned above, RLL had no other side effects during the year of chemotherapy. He never experienced leucopenia, thrombocytopenia or anemia. During April, 1998 we began to taper his intravenous vitamin C. The doses were: 75 grams, one time per week for 2 months; then 75 grams, one time every other week for 2 months; then 75 grams, one time every month for two months; and the 50 grams, one time per month for 6 months. RLL's CEA dropped into the normal range on July 31, 1997 and has remained normal (<3.0 ng/mL). A CT-scan in October, 1998 showed no evidence of metastatic disease. Afterwards during an interview, he described himself as "perfectly healthy".

Comment

This report demonstrates four things about intravenous vitamin C in this patient's case: 1) Intravenous vitamin C was not encouraged by his oncologist; 2) He did not take the advice of his oncologist on the issue of intravenous vitamin C usage; 3) The only side effects of chemotherapy occurred during a hiatus from intravenous vitamin C therapy and disappeared upon reinstatement of vitamin C infusions; and 4) For this patient intravenous vitamin C did not work against the chemotherapy, on the contrary, despite his very poor prognosis he underwent complete remission with the combined therapy.

Intravenous Vitamin C and Chemotherapy in Carcinoma of the Pancreas

In October 1997, a 70-year-old white male from Southeastern Kansas was first seen at our center. After exploratory surgery in December 1997, he had been diagnosed with a low-grade mucinous carcinoma of the pancreas. During surgery there was found to be widely metastatic disease affecting all organs. In January 1997, he was started on Gemzar® (gemcitabine). He had an allergic reaction to Gemzar® and was placed on weekly 5-FU for 9 weeks. He was placed back on Gemzar® in June, 1997 along with Decadron® (dexamethasone) to counteract his allergy. In spite of chemotherapy, his CA-19-9 continued to rise up to 74,000 U/mL (normal <33) until

he was seen at our center. His first vitamin C infusion was 15 grams over one hour, plasma concentration of vitamin C was 34 mg/dL immediately following that infusion. The plasma vitamin C concentration of a healthy person is in the range of 120-200 mg/dL. On his first visit he was also placed on a broad-spectrum nutritional program. The doses of intravenous vitamin C were increased to 75 gram infusions by-weekly. His CA-19-9 serum concentration declined during this treatment until April 1998 when he received the results of a CT-Scan of the abdomen/pelvis which showed no change compared to a CT in January. He related that he felt as if he was wasting his money at that time and stopped his bi-weekly intravenous vitamin C. The evidence in this case suggests that the intravenous vitamin C was acting as a cystostatic and not a cytotoxic agent. When the patient went off the protocol, the tumors became active again. The evidence also suggests that intravenous vitamin C was working independently of the chemotherapy given the CA-19-9 level continued to decrease after chemotherapy was discontinued. This patient died at home on nevertheless, he surpassed his life expectancy

Resolution of Non-Hodgkin's Lymphoma

A 66 year old white female, was diagnosed with a large peri-spinal (L4-5) malignant, non Hodgkin's lymphoma (diffuse large cleaved cell of B-cell lineage) in January, 1995. Her oncologist recommended localized radiation therapy 5 days per week for 5 weeks on 1/17/95 and chemotherapy, but she refused chemotherapy. On 1/13/95 she was started on intravenous vitamin C, 15 grams in 250 cc Ringer's lactate 2 times per week which she continued after completing the radiation therapy. She also began taking several oral supplements to replace those found to be deficient by laboratory analysis and empirical co-enzyme Q-10, 200 mg b.i.d.

On May 6, 1995 she returned to her oncologist with swelling and painful supraclavicular lymph nodes. One lymph node was removed and found to contain malignant lymphoma cells. In spite of recommendations for chemotherapy and more radiation, she refused and continued with her intravenous vitamin C and oral regimen. Within 6 weeks, the supraclavicular nodes were barely noticeable. She continued intravenous vitamin C infusions until December 24, 1996. She has been followed with regularly remains recurrence-free.

This case is rare, the patient refused chemotherapy, which in all likelihood would have been curative. She also had a so-called recurrence of her lymphoma during intravenous vitamin C therapy months after her radiation therapy had ended. The possibility exists that the

lymphoma cells in her lymph nodes were there at the initial diagnosis and the adenopathy occurred during immune recognition of those cells. Also of note is the fact that this patient received only 15 grams of vitamin C per infusion. According to our model, this is not a high enough dose to achieve cytotoxic concentrations of vitamin C in the blood. Therefore, any effect of vitamin C could only be attributed to its biological response modification characteristics and not to its pro-oxidant effect in large IV doses.

The other case is that of a 73 years old white male farmer from Western Kansas was diagnosed with wide-spread non-Hodgkin's lymphoma in the fall of 1994. Biopsies and CT-scan revealed bilateral tumor involvement in his anterior and posterior cervical, inguinal, axillary and mediastinal lymph node beds. Bone marrow aspirate was negative for malignant cells. He was treated with chemotherapy for 8 months that resulted in remission. In July, 1997 he had lost 30 lbs. He returned to his oncologist and a CT-scan at that time showed recurrence. He was placed on chemotherapy in September, 1997. In December, 1997 he developed leucopenia and then extensive left side Herpes zoster. As a result the chemotherapy was discontinued. In March 1998 he came to our center and began receiving intravenous vitamin C and oral nutritional supplements, including lipoic acid. His vitamin C dose was escalated until he was receiving 50 grams (in 500 grams in 500 cc sterile water two times per week). He continued on that dose for 11 months. Three months after beginning vitamin C therapy a CT-scan showed no evidence of malignancy. Another CT-scan in February, 1999 was also clear and he was declared to be in complete remission by his oncologist. Also of note is that this patient was addicted to sleeping pills when first seen at our center. After 3 months of intravenous vitamin C therapy, he replaced the sleeping pills with Kava Tea.

Intravenous Vitamin C in End-stage Metastatic Breast Carcinoma

In 1995 a hospitalized 68 year-old lady with widely metastatic end-stage breast cancer was seen (3). Her latest bone scan showed metastases to "nearly every bone in her skeleton". She was experiencing bone pain which was not controlled with narcotics. At the time of her first consultation she had blood clots in both subclavian veins, and shortly thereafter contracted cellulitis in her left arm and hand secondary to an errant arterial blood draw. After the blood clots were treated with Activase R, she was placed on intravenous vitamin C, 30 grams per day initially, increasing to 100 grams per day over 5 hours. Within one week, the once bed-bound patient began walking the halls or the hospital. Several hospital staff reported that she

looked like a new person. Her cellulitis cleared, and she was discharged from the hospital. At home, she received 100 grams of intravenous vitamin C three(3) times per week. Three months after starting the vitamin C therapy, a bone scan revealed resolution of several skull metastases. Six months after starting the vitamin c, she fell while shopping at a mall, and subsequently died of complications from pathological fractures.

Intravenous vitamin c dose of more than 100 grams per day given in slow infusion are not toxic to cancer patients. Moreover, some cancer patients have had complete remission of their cancer after a series of high dose intravenous vitamin C infusions. Also high doses of IV vitamin C have not interfered with the effect of conventional therapy and may decrease toxicity of chemotherapy.

Resumen

Presentamos una serie de siete casos en los cuales se

utilizó vitamina C endovenosa como agente antineoplásico en el tratamiento de diferentes tipos de cáncer. Los casos de cáncer resumidos son los siguientes: Carcinoma renal (2), cáncer colorectal (1), cáncer pancreático (1), linfoma Non-Hodgkin's (2) y cáncer de mama (1). No se observaron reacciones tóxicas en las altas dosis de vitamina C endovenosa utilizadas. Todos los pacientes se les hicieron laboratorios para descartar deficiencia de Glucosa -6-fosfato deshidrogenasa antes de administrarle la vitamina C para prevenir hemólisis.

References

1. Riordan HD Jackson JA et al. Case study: high dose intravenous vitamin C in the treatment of a patient with adenocarcinoma of the kidney. *J Orthomolec Med.* 1990; 5:5-7.
 2. Riordan HD Jackson JA et al. Case Study: High dose intravenous vitamin C in the treatment of a patient with renal cell carcinoma of the kidney. *J Orthomolec Med* 1998; 13:72-73.
 3. Riordan NH Jackson JA et al. Case study: intravenous vitamin C in a terminal cancer patient. *J Orthomolec Med* 1996; 11:80-82.
-