IVC Administration Quick Reference

(excerpt from TheIVCBook, see www.IVCbook.com)

Table of Contents

Recommend IVC Sources / Recipes:

- Option 1: Mixed from Sodium Ascorbate
- Option 2: Mixed From Ascorbic Acid + Sodium Bicarbonate
- Option 3: Pre-mixed (Commercially Prepared)

Rate

Procedure / Dose / Frequency

IVC Details Before / During / After Surgery

Contraindication and adverse reaction notes

Potentiation

- What To Avoid
- Simultaneous Treatments That Improve Efficacy

Note that many of these guidelines are summarized from Riordan Clinic recommendations, which clinic has done more IVC infusions than any other clinic. It is recommended that the practitioner see their exact protocol:
https://riordanclinic.org/wp-content/uploads/2015/11/RiordanIVCprotocol_en.pdf

More information about their protocol can be found at their website: RiodanClinic.org

Recommend IVC Sources / Recipes:

Option 1: Mixed from Sodium Ascorbate

This method is mixed fresh from powdered sodium ascorbate. This will result in a much less oxidized IVC solution as compared to a commercially available IVC solution. The powder should be as white as possible. Yellowish powder or even pale yellow means some of it has decomposed beyond oxidation (oxidized vitamin C is actually colorless)[1], and has broken down into non-vitamin-C byproducts. White powder sodium ascorbate does exist, though with a light pale yellow hue should be negligibly different and is acceptable. Powder that fresh may be easier to find when ordering from a source that does fairly high turnover, or when ordering directly from the manufacturer. 99.99% pure Food Grade from a reputable supplier is adequate, since vitamin C is inherently very sterile and is a powerful antisepsis

agent.

- Mix with sterile water, not Ringer's solution or similar sodium-based saline, and not Dextrose. Avoid saline (will cause sodium overload with the sodium ascorbate).
- Use an inline IV filter.
- Alternatively Ringer's solution can be used if the dose less than 25g.

  The Cathcart formula is: 0.5g / 1ml water, which is the same concentration used in commercial IVC solutions. Dr. Cathcart also added 2mg / 1ml Disodium EDTA to this mix, mixed freshly before administration, which helped decrease adverse reactions from bloodborne debris that might get dislodged during treatment.
- Additionally, adding magnesium (0.2 mL/100mL of MgCl) reportedly will reduce the incidence of vein irritation and spasm, as will infusing at a slower rate[2].
- Note that even with distilled water half-life (for oxidation) is only about 60-90 minutes. Ideally it should be mixed just prior to administration.[3]

Option 2: Mixed From Ascorbic Acid + Sodium Bicarbonate

This will, on average will yield a solution that is even more reduced than the sodium ascorbate solution since the ascorbic acid is much more stable, but for most purposes the difference will be negligible. This is rarely done, but is included here for completeness sake, or in the event that the available sodium ascorbate is not desired and administration is considered urgent.

> As an alternative to sodium ascorbate use pure ascorbic acid, then buffered with sodium bicarbonate by weight as follows: *2.1 grams AA : 1.0 gram NaHCO3 (6.8 pH)*

See the bullet points above for "Option 1" for mixing guidelines.

Option 3: Pre-mixed (Commercially Prepared)

This uses a commercially prepared solution. It may be labelled as Ascorbic Acid, but upon further inspect it should identify that it is buffered with sodium as sodium ascorbate, but the IVC solution will still be slightly acidic (which helps shelf-life). Because of this the practitioner might need to slow down the administration rate if the patient is experiencing a burning sensation (this side effect is uncommon if rate does not exceed 0.5g/min)

Commercially prepared solutions will likely already have a very large amount of oxidized vitamin C but clinically they have demonstrated efficacy as an IVC solution.

Rate

The standard rate is 0.5g/min to 1.0g/min. Start low (0.5g/min) then increase as long as patient is comfortable. When sodium ascorbate is mixed as shown above (1.0g/2.0ml) that works out to roughly a drip every 1 second (1.0g/min), to every 2 seconds (0.5g/min). Administration can take 30 min (example: 30 grams at 1g/min) to 3 hours (example 90 grams at 0.5g/min) depending on rate and dose. This is easily calculated by dividing the dose by the rate. In general greater apoptosis efficacy is observed at the higher infusion rates.

Procedure / Dose / Frequency

1. A g6pd test should be mandatory prior to doses greater than 25g to make sure the patient has a normal level of the g6pd enzyme. If they are deficient (very doubtful for people with ancestry not from malaria-area origins, and especially doubtful for women) then IVC can cause severe anemia at the high doses (above 30 grams).
    NOTE: Patients who fail the g6pd test can still easily tolerate low doses up to 25 grams.[4] This will still get them within cancer killing range during the administration and for some time afterward, and will (according to Quality of Life studies) be sufficient to provide them with most all of the Quality of Life benefits that come with IVC. High dose IVC (50+g) only increases cancer killing efficacy (significantly), but will not necessarily improve QOL.
2. Proceed thoughtfully with patients sensitive to iron-overload. Note that lowDose IVC, such as up to 25g will still provide all the QOL benefits and aid cancer killing (25g still yields 50X higher blood concentration than is possible from megadosing).
3. Proceed thoughtfully with patients who may be adversely affected by volume expansion such as those with congestive heart failure and edema/ascites.
4. When in doubt increase patient hydration (water only) as a first measure if they have not consumed enough water prior to administration, then decrease flow rate as a 2nd measure. Patient should be well hydrated prior to infusion. Frequent trips to the bathroom may be expected.
5. The first 3 infusions can be done on back-to-back days to get up to the desired level.
    a. 15g first time, monitor closely for patient reaction.
    b. Halfway to the max dose the 2nd time.
    c. Max dose thereafter (adequate for surgical recovery ... Patients should target based on weight: 1.5g/kg normalized to a BMI of 24kg/m^2. This is the Riordan protocol. For the average adult male this is 80g+ for cancer. Note up to 200g/dose has been tested and deemed "well tolerated", but it is lengthy and many patients do not easily tolerate such high doses).[5]
6. Repeat the max dose 2x or 3x weekly.
7. After completing the total course for IVC treatment (generally 1-2 months), the patient may want to maintain a lower frequency for maintenance purposes.

IVC Details Before / During / After Surgery

1. The patient should get up to the max dose before surgery.
2. **IMPORTANT**: No IVC, and no oral C within 24 hours *before* surgery. IVC (and megadosing) significantly reduces anesthesia for up to 12 hours.
3. IVC as *soon* as surgery is completed will significantly help recovery and reduce the occurrence of metastasis related to the surgery.
4. Repeat the max dose 2x or 3x weekly until patient is mostly back to normal functioning.

Contraindication and adverse reaction notes

If a negative reaction is observed the following recommendations can be beneficial:

1. pH should be as close to 6.5 - 7.0. Below 5.5 or above 8 can be problematic.Commercial preparations can be as low as 5.5 which can be uncomfortable for some patients. pH can be increased with Sodium Bicarbonate.

2. Insure the solution is mixed with sterile water, not ringer's solution or similar that may have sodium already in it. Ringer's solution can be used if dose is less than 25g.
3. Pre-IV push of intramuscular injection of antibiotic and steroid (eg. Solu Cortef) for subsequent administrations will generally improve the experience for patients, especially with regard to chills and shaking.
4. Disodium EDTA scavenges/neutralizes heavy metal ions that might get dislodged during resulting detoxification. Dr. Robert Cathcart usually added this to the IV at about 400mg per 100g Sodium Ascorbate. Commercially prepared IVC contains it also.
5. Lower the rate (which will debride less toxicities) if patient is significantly uncomfortable.
6. Follow IV with a "Mop up" level of vitamin C … this is low enough to not debride any additional toxins from your tissues, but high enough to assist the detoxification of blood-borne debris. Any of the three following methods have been successfully tried:
    - Supplementation with oral vitamin C to bowel tolerance immediately following. According to Dr. Cathcart post-IV headaches were common until he started insisting on this.
    - Supplementation of 3g - 10g of reputable liposomal C to bowel tolerance levels is another option.
    - Follow the infusion with a slow drip (example: 5g-10g over the course of 30 minutes an hour) to "mop up" any debris.
7. If using freshly mixed solution, switching to a commercial preparation can be less potent due to oxidation, and it already has Disodium EDTA included.
8. The patient should drink plenty of water, which should be a standard practice anyway. Most side effects are at least ameliorated with increased water consumption.
9. An antihistamine such as Benadryl can help with inflammation agitation.
10. Use an in-line IV filter, especially if mixed from powder, and avoid Ringers Lactate solution, other saline, and dextrose. Ringers Lactate can be used if dose is less than 25g.
11. Avoid simultaneous administration with anything from the "What to Avoid" list below, as they can significantly diminish the beneficial H_2O_2 production.
12. The solution should be as colorless as possible. Yellow solution contains oxidized vitamin C and degraded vitamin C byproducts.
13. If the reaction is arthritis, it could be due to insufficient adrenal operation so they aren't producing enough cortisol. They should be tested for this condition, and start taking a hydrocortisone if necessary.

Potentiation

What To Avoid

Avoid simultaneous administration of the following (by IV or orally) as they will diminish the cancer-killing pro-oxidation of the IVC solution:

- Avoid Simultaneous Glutathione (diminished effectiveness) [6] [7] [8]
- Avoid Simultaneous Melatonin (diminished effectiveness)
- Avoid Simultaneous Vitamin D (diminished effectiveness)
- Avoid Simultaneous DMSO
- Avoid Simultaneous SOD SuperOxide Dimutase

- Avoid Simultaneous NAD+ boosting or regenerating factors like NAC [8]
- Avoid Simultaneous Laetrile (contraindication) [9]
- Avoid Simultaneous use with Dextrose [10]
- Avoid stale IVC solutions [11]

Note: All of the above are excellent to use when *not* doing IVC, but they employ a different cancer-fighting mechanism that renders IVC useless when done simultaneously. Allow a couple hours between IVC and any of these treatments, and avoid oral dosing of the above on cancer-fighting days.

Simultaneous Treatments That Improve Efficacy

The following are the only known substances to potentiate IVC, all other supplements (oral or by IV), despite how cancer-therapeutic, should not be done within a couple hours of IVC administration in the event that they diminish H_2O_2 expression.

- Do Simultaneous Alpha Lipoic Acid [12]
- Do Simultaneous Vitamin E [13]
- Do Simultaneous Vitamin K3 if possible (Apatone™)[12] [14], otherwise do take Vitamin K2 [15]
- Do Simultaneous Lecithin [16]
- Do Simultaneous Artemisinin if possible [17]
- Do Simultaneous D-fraction (Maitake mushroom) supplement if possible [18]
- Do Simultaneous DCA (dichloroacetate) [19]
- Do Simultaneous Quercetin [14]
- Do Simultaneous Curcumin [14]
- Do Simultaneous with other oxidative therapies. Hypoxia at the cancer site is likely the #1 reason when treatment efficacy falls short of in vitro success. Here's how to mitigate that:
    - O2 Mask
    - Ozone generator in the room
    - Hyperbaric Oxygen
    - DCA (dichloroacetate) administration
    - Exercise Bike, increases blood flow to tumor and oxygenation
- Do Simultaneous Conventional Chemotherapy

---

(1) B. Pecherer; The Preparation of Dehydro-L-ascorbic Acid and its Methanol Complex. Some Reactions of Dehydro-L-ascorbic Acid; J. Am. Chem. Soc., 1951, 73 (8), pp 3827–3830 DOI: 10.1021/ja01152a080 Publication Date: August 1951 http://pubs.acs.org/doi/abs/10.1021/ja01152a080

(2) Riordan Details on Cathcart Protocol, http://www.doctoryourself.com/RiordanIVC.pdf

(3) Duconge J, Miranda-Massari JR, Gonzalez MJ, Jackson JA, Warnock W, Riordan NH.; Pharmacokinetics of vitamin C: insights into the oral and intravenous administration of ascorbate.; P R Health Sci J. 2008 Mar;27(1):7-19. http://www.ncbi.nlm.nih.gov/pubmed/18450228

(4) Hugh Riordan, MD, Neil Riordan, PhD, Joseph Casciari, PhD, James Jackson, PhD, Ron Hunninghake, MD, Nina Mikirova, PhD, and Paul R. Taylor; THE RIORDAN INTRAVENOUS VITAMIN C (IVC) PROTOCOL FOR ADJUNCTIVE CANCER CARE: IVC AS A CHEMOTHERAPEUTIC AND BIOLOGICAL RESPONSE MODIFYING AGENT https://riordanclinic.org/wp-content/uploads/2015/11/RiordanIVCprotocol_en.pdf

(5) Christopher M. Stephenson, Robert D. Levin, [...], and Christopher G. Lis, Phase I clinical trial to evaluate the safety, tolerability, and pharmacokinetics of highDose intravenous ascorbic acid in patients with advanced cancer; Cancer Chemother Pharmacol. 2013 Jul; 72(1): 139–146. Published online 2013 May 14. doi: 10.1007/s00280-013-2179-9 http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3691494/?report=reader

(6) Winterbourn CC, Metodiewa D. Reactivity of biologically important thiol compounds with superoxide and hydrogen peroxide. Free Radic Biol Med. 1999 Aug;27(3-4):322-8. http://www.ncbi.nlm.nih.gov/pubmed/10468205

(7) Chen P, Stone J, Sullivan G, Drisko JA, Chen Q. Anti-cancer effect of pharmacologic ascorbate and its interaction with supplementary parenteral glutathione in preclinical cancer models.; Free Radic Biol Med. 2011 Aug 1;51(3):681-7. doi: 10.1016/j.freeradbiomed.2011.05.031 http://www.ncbi.nlm.nih.gov/pubmed/21672627

(8) Uetaki M, Tabata S, Nakasuka F, Soga T, Tomita M. Metabolomic alterations in human cancer cells by vitamin C-induced oxidative stress. Scientific Reports. 2015;5:13896. doi:10.1038/srep13896. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4563566/

(9) Bromley J, Hughes BG, Leong DC, Buckley NA. Life-threatening interaction between complementary medicines: cyanide toxicity following ingestion of amygdalin and vitamin C.; Ann Pharmacother. 2005 Sep;39(9):1566-9. Epub 2005 Jul 12. http://www.ncbi.nlm.nih.gov/pubmed/16014371

(10) Cameron E, Campbell A.; The orthomolecular treatment of cancer. II. Clinical trial of highDose ascorbic acid supplements in advanced human cancer.; Chem Biol Interact. 1974 Oct;9(4):285-315.; http://www.ncbi.nlm.nih.gov/pubmed/4430016

(11) Alexander J. Michels and Balz Frei; Myths, Artifacts, and Fatal Flaws: Identifying Limitations and Opportunities in Vitamin C Research; Nutrients. 2013 Dec; 5(12): 5161–5192. Published online 2013 Dec 16. doi: 10.3390/nu5125161 http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3875932/

(12) JJ Casciari, NH Riordan, TL Schmidt, XL Meng, JA Jackson, and HD Riordan; Cytotoxicity of ascorbate, lipoic acid, and other antioxidants in hollow fibre in vitro tumours; British Journal of Cancer (2001) 84(11), 1544–1550 doi: 10.1054/ bjoc.2001.1814,; http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2363673

(13) Tomasetti M, Strafella E, Staffolani S, Santarelli L, Neuzil J, Guerrieri R.; alpha-Tocopheryl succinate promotes selective cell death induced by vitamin K3 in combination with ascorbate.; Br J Cancer. 2010 Apr 13;102(8):1224-34. doi: 10.1038/sj.bjc.6605617. Epub 2010 Mar 23.; https://www.ncbi.nlm.nih.gov/pubmed/20332775

(14) Lamson DW, Gu YH, Plaza SM, Brignall MS, Brinton CA, Sadlon AE.; The vitamin C:vitamin K3 system - enhancers and inhibitors of the anticancer effect.; Altern Med Rev. 2010 Dec;15(4):345-51.; https://www.ncbi.nlm.nih.gov/pubmed/21194250

(15) Verrax J, Taper H, Buc Calderon P.; Targeting cancer cells by an oxidant-based therapy.; Curr Mol Pharmacol. 2008 Jan;1(1):80-92.; https://www.ncbi.nlm.nih.gov/pubmed/20021426

(16)Pancorbo D, Vazquez C, Fletcher MA.; Vitamin C-lipid metabolites: uptake and retention and effect on plasma C-reactive protein and oxidized LDL levels in healthy volunteers.; Med Sci Monit. 2008 Nov;14(11):CR547-51.; http://www.ncbi.nlm.nih.gov/pubmed/18971870
(17)Efferth T.; Molecular pharmacology and pharmacogenomics of artemisinin and its derivatives in cancer cells.; Curr Drug Targets. 2006 Apr;7(4):407-21.; http://www.ncbi.nlm.nih.gov/pubmed/16611029
(18)Alexander B1, Fishman AI, Eshghi M, Choudhury M, Konno S.; Induction of cell death in renal cell carcinoma with combination of D-fraction and vitamin C.; Integr Cancer Ther. 2013 Sep;12(5):442-8. doi: 10.1177/1534735412473643. Epub 2013 Jan 22.; https://www.ncbi.nlm.nih.gov/pubmed/23341484
(19)Akbar Khan, MD; Denis Marier, ND; Eric Marsden, ND; Douglas Andrews, ND; Isaac Eliaz, MD; A Novel Form of Dichloroacetate Therapy for Patients With Advanced Cancer: A Report of 3 Cases; ALTERNATIVE THERAPIES, VOL. 20, SUPPL. 2 27 http://alternative-therapies.com/at/web_pdfs/s202khan.pdf