

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](#)

[Dilution](#)

[IV Mixing Chart](#)

[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

The University of Kansas Medical Center protocol, which is similar is found here:

<https://goo.gl/2m9c9y>

***Much* more information is found in appendix B of the www.IVCbook.com**

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)^{c1}, 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 antiseptic agent. Corn-free formulations are recommended as some reportedly have reactions to corn-based products.

Super fine powder (comes off like a cloud of particles when poured) is more likely to be oxidized since its surface area is up to 100x greater than larger crystals. It may be much easier to mix, but just adding few drops results in a yellow-brown liquid (which gets diluted when more water is added). This isn't even vitamin C ... it's oxidized vitamin C that is further broken down to non-vitamin C products. That's why larger crystals will result in more reduced and more pure (less post-oxidation degradation) vitamin C.

- Mix with sterile water, not Ringer's solution or similar sodium-based saline, and not Dextrose. Avoid saline (else will cause sodium overload with the sodium ascorbate).
 - Note: Ringer's solution can be used if the dose less than 25g.
- Use an inline IV filter.
- 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. EDTA is automatically included in all commercial preparations.
- Dilute this according the IV Mixing Chart shown below.
- 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^{c2}.
- 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.^{c3}

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, which is now the most popular method. 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. Administration can take 20 min (example: 15 grams at .7g/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 efficacy is observed at the higher infusion rates.

Rates and infusion times are given below in the IV Mixing Chart, at the 6 most common doses (15g, 25g, 50g, 75g, 100g, 125g). Rates are given as drips per second for easy validation, but can be converted to DPM by multiply by 60, or ml/min by multiplying by 4 (eg. 2dps = 120dpm = 8ml/min).

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 usually still easily tolerate low doses up to 25 grams.^{ca} The practitioner should proceed cautiously as they go from 15g to 25g. They can also receive multiple doses at these ranges, 3 hours apart, which possibly could be as efficacious as a large 100g dose if NAD depletion is the major cancer-killing mechanism of the IVC. According to Quality of Life studies this will also 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 low dose 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 a risk for 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 if the patient is not responding well. 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. Do not proceed to higher levels without G6PD test. 15g can be repeated indefinitely even for G6PD patients, and most G6PD patients can take 25g with no issues. This can be repeated after 3 hours as blood ascorbates should return to normal by then. This is a powerful workaround for G6PD patients.
 - c. 25g the 2nd time.
 - d. 50g the 3rd time.
 - e. Max dose thereafter (adequate for surgical recovery ... Patients should target based on weight: 1.2g/kg normalized to a BMI of 24kg/m². This is the Riordan protocol. For the average adult

male this is 90g-100g 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).⁶⁵

6. Repeat the max dose 2x or 3x weekly.
7. After completing the total course for IVC treatment (generally 1-2 months), preferably until the cancer is in remission the patient may want to maintain a lower frequency for maintenance purposes (1-2 times monthly).
8. After periodic IVC treatment as described the patient should still consume up to bowel tolerance and taper off their intake as they feel completely healed until they are consuming no less that 3g daily.

Dilution

For patients without osmotic concerns it is not uncommon for some clinics to use the commercial solution straight without any dilution (especially for the low doses) but instead of diluting the solution they will have the patient drink lots of water in order to compensate for the very high tonicity of the fluid. The patient should have at least 8 ounces of water previous to administration, and should be drinking water to avoid feeling dehydrated. Many of the side effects of IVC can be ameliorated using this strategy.

This hypertonic strategy is not compatible with patients who have osmotic challenges, such as pulmonary congestion, or for any patient for whom that *might* be a concern. Instead the solution should be diluted prior to administration. Many clinics do this as a precaution for all patients, as it is a good practice that side steps any risks associated with hypernatremia. Below is a chart (reproduced from instructions used at University of Kansas Medical Center)⁶²⁰ wherein the bolded numbers show the resulting osmolarity for a given dose and infusion carrier volume. Practitioners will want to target molarities toward the lower end of the bolded numbers for patients with osmotic concerns. In general, anything between 300-1200 is well tolerated by most patients.

Na Ascorbic Acid (calculated using 500mg/mL ascorbic acid)	Osmolarity calculated in Sterile Water			Osmolarity calculated in Ringer's Lactate		
	250 mL	500 mL	1000 mL	250 mL	500 mL	1000 mL
1 gram	72	36	18	347	312	297
5 grams	261	131	65	528	404	342
10 grams	499	249	125	754	517	399
15 grams	737	368	184	981	630	455
25 grams	1212	606	303	1433	857	568
30 grams	1449	725	362	1660	970	625
50 grams	2400	1200	600	2565	1423	851
60 grams	2875	1437	719	3018	1649	965
75 grams	3588	1794	897	3697	1989	1134
100 grams	4776	2388	1194	4829	2555	1427

Note that this chart assumes that prior to adding the IVC solution, the practitioner will first remove an equal amount from the carrier. For example, if 200ml of IVC solution (100g) are to be added to the bag, then first 200ml of the carrier solution must first be removed.

Note also how the bolded numbers for Ringer's Lactate are *not* circled in blue for concentrations over 15 grams. That's because above 15 grams the practitioner should use only sterile water.

Finally, of important consideration: if additional nutrients are added then the osmolarity will go up. The concern is where a cocktail of many things are added when adding another 20% volume or more to the total fluid. These then need to be added to the total molarity (weighted by volume) and the carrier adjusted to keep the osmolarity within reason.

If the dilution is done at a compound pharmacy, it should be done locally (preferably at the clinic) and used as quickly as possible after diluted, since at these lower dilutions the solutions oxidize much more quickly than it does in its concentrated form.



















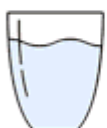

Below is a chart which shows the most common dosages normally used in IVC, along with the recommended dilutions. The chart above can provide greater detail regarding the osmolarity for each dose shown below.

IV Mixing Chart

The chart shown on the next page is a best-practices assessed from methods recommended by multiple sources.

Note: This chart in the book does not have the "IVC Book.com" watermark

Note that adding electrolytes preemptively mitigates many side effects due to loss from subsequent volume loss, and is often added slightly above normal blood concentration as follows to account for ion chelation by the ascorbate.

Dose	Vitamin C	Dilution & Drip Rate	Electrolytes
15g	30ml of  ...into bag →	250ml  Or  3DPS 21min 0.7g/min	← into bag: MgCl ₂ 200mg 
25g	1 X  ...into bag →	250ml or 500ml  1.5DPS 42min 0.6g/min 3DPS 42min 0.6g/min	← into bag: MgCl ₂ 400mg CaCl ₂ 100mg KCl 4mEq 
50g	2 X  ...into bag →	500ml  1.5(3Drips/2Sec) 83 min 0.6 g/min	← into bag: MgCl ₂ 800mg CaCl ₂ 200mg KCl 8mEq 
75g	3 X  ...into bag →	1000ml  2DPS 125 min 0.6 g/min	← into bag: MgCl ₂ 800mg CaCl ₂ 200mg KCl 8mEq 
100g	4 X  ...into bag →	1000ml  1.5(3Drips/2Sec) 167 min 0.6 g/min	← into bag: MgCl ₂ 800mg CaCl ₂ 200mg KCl 8mEq 
125g	5 X  ...into bag →	1000ml  & 12oz x  1.3(4Drips/3Sec), 188min, 0.67g/min	← into bag: MgCl ₂ 800mg CaCl ₂ 200mg KCl 8mEq 

* See <https://www.naturalmedicinejournal.com/journal/2014-02/intravenous-vitamin-c-cancer>

Warning: Renal issues, or osmotic challenges like CHF/pulmonary edema should *not* exceed 2DPS, especially with long duration (exceeding 1 hour) flow administration may be reduced even further depending on the patient condition.

Important: Before Sodium Ascorbate or Electrolytes are added, carrier fluid is extracted equal to the amount of Sodium Ascorbate (eg. if 200ml IVC is to be added, 200ml is first extracted from the carrier). Calculations for these rates (g/min) assume this. DPS - Drips per second provided here for reality check, using the rate for standard infusion sets: 15 gtt/ml. Multiply by 60 for DPM or multiply by 4 for ml/min. (eg. 2dps = 120dpm = 8ml/min).

Note: 0.6g/min is a good starting point. If well tolerated, patient may be able to increase drip rate by 50% at most (eg. 2dps +3dps).

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.

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 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. Electrolytes should be added as needed. See IV Mixing chart above. This can help with vein spasm, irritation, and other issues related to low electrolytes.
7. 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.
8. If using freshly mixed solution, switching to a commercial preparation can be less potent due to oxidation, and it already has Disodium EDTA included.
9. The patient should drink plenty of water, which should be a standard practice anyway. Many side effects are at least ameliorated with increased water consumption. These can be avoided with proper dilution.
10. An antihistamine such as Benadryl can help with inflammation agitation.
11. Use an in-line IV filter.
12. Avoid simultaneous administration with anything from the "What to Avoid" list below, as they can significantly diminish the beneficial H₂O₂ production.
13. The solution should be as colorless as possible. Yellow solution contains oxidized vitamin C and degraded vitamin C byproducts. Myer's cocktail is normally yellow, but it is not good for cancer treatment.

14. 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.

Potentialiation

What To Avoid

Avoid *simultaneous* administration of the following (by IV or orally) as they may diminish the cancer-killing pro-oxidation of the IVC solution. Note that subsequent administration (back to back) of these however is most likely beneficial, just not simultaneous administration:

- Avoid Simultaneous Glutathione (diminished effectiveness) [c6](#) [c7](#) [c8](#)
- 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 [c8](#)
- Avoid Simultaneous Laetrile (contraindication) [c9](#)
- Avoid Simultaneous use with Dextrose [c10](#)
- Avoid stale IVC solutions [c11](#)

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 H₂O₂ expression.

- Do Simultaneous Alpha Lipoic Acid [c12](#)
- Do Simultaneous Vitamin E [c13](#)
- Do Simultaneous Vitamin K3 if possible (Apatonetm)[c12](#) [c14](#), otherwise do take Vitamin K2 [c15](#). Vitamin K3 is a controlled substance because extreme overdose of K3 (like all fat-soluble vitamins eg. vitamins A, D, and E) can be fatal. Being no more dangerous than A, D, and E, it should not be controlled, but it is.
- Do Simultaneous Lecithin [c16](#)
- Do Simultaneous Artemisinin if possible [c17](#)
- Do Simultaneous D-fraction (Maitake mushroom) supplement if possible [c18](#)
- Do Simultaneous DCA (dichloroacetate) [c19](#)
- Do Simultaneous Quercetin [c14](#)
- Do Simultaneous Curcumin [c14](#)
- Do Alkalinizing Foods (especially a colorful selection of vegetables)

- Do Simultaneous with other oxygenating 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
 - This is most likely the most effective way, but is seldom done
- Do Simultaneous Conventional Chemotherapy

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C2) Riordan Details on Cathcart Protocol, <http://www.doctoryourself.com/RiordanIVC.pdf>

C3) Duconge J, Miranda-Massarì 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>

C4) 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
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C5) 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
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