Intravenous Nutrition Protocols

from

A-to-Z

For the Complementary Medical Practice

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TABLE OF CONTENTS

Standard Intravenous Infusion

	Low Dose	High Dose
IV solution (cc)	**100 SW**	**400 SW**
Estimated Osmolarity (mOsm/L)	**334**	**336**
Time of IV Infusion:	**45min-1hr**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

The Standard Intravenous Infusion (SII)

The Standard Intravenous Infusion (SII) is considered the "bread and butter" of intravenous nutritional therapy because of its long and continued frequency of use. The SII is considered a basic formula for overall nutritional support. The SII consists of relatively low concentrations of a limited number of nutrients (see Table 1 below). Its usefulness lies in the fact that it can be used for virtually any condition with extreme safety. It is a common practice for health care providers to add on to the basic SII formula and continue to modify nutritional levels to idealize the formula for each patient.

For health care providers new to intravenous nutritional therapies choosing the SII for the first several intravenous infusions helps ensure patient tolerance before attempting to administer higher dose and more complex drips. Following this basic formula the health care provider can tread *softly* initially building intravenous dosages safely and slowly for their patients.

Therapeutic rational and biochemical explanations have been provided for many of the nutrients listed under each condition. The health care provider is encouraged to continue to add and alter the nutritional protocol

recommendations based upon continued advances and sound scientific rational.

First: Inform your patients of potential risks and benefits of intravenous nutritional infusions and have each patient sign an intravenous informed consent. It is recommended the practitioner consult, "The Patient's Guide to Intravenous Nutrition (16 pgs and fully referenced. Order can be placed by calling Optimal Health Press and Nutritionals, Inc. at 1-914-666-2943).

Second: Begin with the low dose SII at the low end of the dose range; for example the first several infusions administered over 2-3 weeks might consist of that outlined in formula 1 below. Generally speaking, the B-complex dose is rarely increased beyond 2cc's and the ascorbic acid dose rarely beyond 20cc's except for acute and chronic health problems - and probably not for health maintenance (see the Fourth step below).

Third: Once patient tolerance and overall nutritional status has been improved from the first several low dose SII's the formula can be increased as outlined in Formula 2.

Fourth: Formula 3 represents a high dose SII. After administering this level dose for two or more IV's the practitioner should consult the appropriate section in this manual for further supplement recommendations. Formula 4 gives an example of how the practitioner should integrate the dose ranges of the SII along with the dose recommendations for a particular disease condition. The example below is that of cardiovascular disease; Figure 6 summarizes the nutritional options found under this section.

The practitioner would begin by increasing the nutritional levels to the maximum desired amounts for a predetermined amount of time (based upon clinical judgment), and then add one or at most two nutrients in the next IV infusion reaching the maximum desired dosages over a predetermined number of IV's. The practitioner would continue to successively add a new nutrient or two once the maximum desired dosages reached for the prior one or two nutrients added. This process would continue until the total number of nutritional ingredients is reached over many weeks or months

and/or until the desired dose ranges have been met. As always, clinical judgment and experience will help the practitioner develop sound protocols for maximum clinical results.

Formula 1: Initial low dose SII	
Calcium Gluconate	1cc
Magnesium Chloride	1cc
Pantothenic acid	1cc
Pyridoxine	1cc
Ascorbic acid	5cc
B-complex	1cc
Administered in 100cc of Sterile Water over 30-45minutes.	

Formula 2: Increased dose SII	
Calcium Gluconate	2cc
Magnesium Chloride	2cc
Pantothenic acid	2cc
Pyridoxine	2cc
Ascorbic acid	10cc
B-complex	1cc
Administered in 220cc of Sterile Water over 45 minutes to 1 hr.	

Formula 3: High dose SII	
Calcium Gluconate	2cc
Magnesium Chloride	2cc
Pantothenic acid	2cc
Pyridoxine	2cc
Ascorbic acid	20cc
B-complex	2cc
Administered in 400cc of Sterile Water over 1 15min- 2hrs.	

Note: Formula 3 is the highest dose SII administered to a patient prior to incorporating the low dosage range recommendations found under the appropriate section of this text.

Formula 4:		
High Dose SII	**Based on the Cardiovascular section**	
Calcium Gluconate	2cc	May be increased up to 10cc's or more
Magnesium Chloride	2cc	May be increased up to 10cc's or more
Pantothenic acid	2cc	May be increased up to 3cc's or more
Pyridoxine Hydrochloride	2cc	May be increased up to 3cc's or more
Ascorbic acid	20cc	UP to 20cc's of ascorbate or more

B-complex	2cc	May remain at 3cc's

ADDITIONAL NUTRITIONALS MAY BE ADDED WHICH INCLUDE THOSE LISTED BELOW.

The dosage ranges are only guides and the practitioner should exercise his or her personal clinical expertise when modifying intravenous infusions.

Figure 6: Heart Disease nutritional options	
Folic acid	1cc
Ascorbic acid	5cc-20cc
Calcium Gluconate	2cc-10cc
Magnesium Citrate	2cc-10cc
B12(IM)	1cc-3cc
Pantothenic acid (B5)	1cc-3cc
B-complex	1cc-2cc
Pyridoxine Hydrochloride (B6)	1cc-3cc
Taurine	1cc-4cc
Coenzyme Q10 (IM or IV)	1cc-2cc
Pantethine	1cc-3cc
Niacin	1cc
Chromium	1cc-6cc
Zinc Citrate	1cc-3cc
Arginine	2cc-6cc
Carnitine	2cc-6cc
Pantethine	1cc-3cc
CoQ10 (above 1cc administer IV)	1cc-3cc
Pyridoxine Hydrochloride (B6)	2cc-4cc
Multimineral	1cc-3cc

Allergy

	Low Dose	High Dose
IV solution (cc)	**200 SW**	**450 SW**
Estimated Osmolarity (mOsm/L)	**328**	**447**
Time of IV Infusion:	**1hr**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic Acid 10cc-40cc (500mg/mL)

- Antihistamine effects by increasing plasma levels lowering histamine levels

Calcium Gluconate 2cc-5cc

- Atopic dermatitis

Pantothenic acid (B5) 2cc-5cc

- Too large a dose might cause drying of the nasal mucosa

Pyridoxine Hydrochloride (B6) 2cc-5cc

Zinc Citrate 1cc-3cc

- Lower in erythrocytes with chemical sensitivity

B-Complex (niacin) $\frac{1}{2}$-1cc

- Niacin inhibits mast cell degranulation and release of histamine
- Nicotinamide (IM or IV) at a dose of 10-20 mg

Multimineral 1-2cc

Pantethine 1-3cc (25mg/mL)

- Derivative of pantothenic acid and an immediate precursor to coenzyme A

Molybdenum 1cc (2mcg/mL)

Magnesium Chloride 2cc-10cc (100mg/mL)

- Deficiency often increases allergic reactions

Selenium 1c-5cc (40mcg/mL)

- Important for reducing environmental allergies
- Antioxidant properties assist healing and reduce inflammatory stress

Cyano- or Hydroxycobalamin (B12 – IM) 1cc-3cc

- My block sulfite sensitivity
- 1000 mcg for four weeks for asthma, contact dermatitis, uticaria, atopic dermatitis

NOTES

Arrhythmia

	Low Dose	High Dose
IV solution (cc)	150 SW	400 SW
Estimated Osmolarity (mOsm/L)	323	358
Time of IV Infusion:	1hr	11/2-2hrs
Continued Therapy:	1-3/wk for 4-6 wks and reevaluate	
Comments:	Appropriate dietary, oral supplement	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Magnesium chloride	2cc-10cc (200mg/mL)
Potassium chloride	4cc-6cc (10mEq)
Manganese chloride	1cc-2cc (1mg/mL)
Selenium	1cc-4cc (40mcg/mL)

NOTES

Asthma

	Low Dose	High Dose
IV solution (cc)	**100 SW**	**400 SW**
Estimated Osmolarity (mOsm/L)	**356**	**358**
Time of IV Infusion:	**30 min**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic Acid	5cc-20cc (500mg/mL)
Arginine	2cc-5cc (100mg/mL)
Magnesium Chloride	2cc-10cc (200mg/mL)
Pantethine	1cc-2cc (25mg/mL)
Pyridoxine Hydrochloride (B6)	2cc-6cc (100mg/mL)
Multimineral	1cc-4cc
B-complex	1cc-2cc

NOTES

Cancer

	Low Dose	High Dose
IV solution (cc)	**250 SW**	**500 SW**
Estimated Osmolarity (mOsm/L)	**278**	**781**
Time of IV Infusion:	**1, 15min**	**2hrs**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**The fact is that most people with**	

cancer do not die of their cancer, but instead succumb to secondary infections and malnutrition; in either case enhancing nutritional status is a useful endeavor. The medical and nutritional literature is abundant with references demonstrating the powerful benefits of nutrition for the prevention of cancer and as an adjunctive modality. Appropriate dietary, oral supplement and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be addressed.

Riboflavin-5-phosphate (B2) 2cc-10cc (10mg/mL)

This vitamin produces a brownish-yellow color when added to an IV mixture; it is best added as a last ingredient along with the B-complex that has a yellow-orange color.

- Inversely correlated with prostate cancer risk
- Blood levels may be inversely correlated with esophageal cancer risk

B-Complex 1cc-2cc

Thiamin Hydrochloride (B1) 1cc-3cc (100mg/mL)

- Inversely correlated with prostate cancer risk

Folate (IV) 1cc-3cc (5mg/mL)

- Blood levels may be reduced in cervical cancer
- Helps to reverse dysplastic cervical cells
- Levels may be inversely related to rectal cancer risk

- Do not give to the patient if they are concomitantly receiving the chemotherapeutic drug Methotrexate

Vitamin A

- Inversely related to a number of cancers such as lung, esophageal, prostate, gastric, bladder, head and neck, skin cancers, leukemia
- Low A (retinol) may correlate with poor chemotherapy response
- Supplementation may reverse leukoplakia

Pyridoxine Hydrochloride (B6) 1cc-6cc (100-600mg)

- B6 acts as a coenzyme for thymidine synthesis. A deficiency of B6, and thus thymidine, may increase mutagenesis and tumorogenesis
- Blood levels often reduced in cancers of the oral cavity, cervical, liver, lung, prostate, bladder (determined by blood levels of pyridoxal phosphate and RBC alanine aminotransferase activity).

Vitamin B12 (IM) 1cc-6cc (1000mcg/mL)

- May help the precancerous condition often found in smokers known as bronchial squamous metaplasia
- May inhibit carcinogenesis in general

Ascorbic Acid 10cc-75cc (500mg/mL)

- Inversely correlated with cancer risk particular for oral cavity, stomach, pancreas, esophagus, cervix, rectum, breast and lung
- Enhances the effects of analgesics in breast cancer patients
- Vitamin C may improve the potential effect of radiation therapy

- May enhance the potential effect of chemotherapy and reduce toxic side-effects

Calcium Gluconate 2cc-6cc (9.6 mg/mL)

- Some practitioners recommend against the use of calcium in both the oral and intravenous form for those with cancer for fear of hypercalcemia. Many cancers demonstrate increased serum levels. If the cancer is of a metastatic type it is easy to understand that calcium levels will increase. During some cancers parathyroid hormone may be produced by the tumor thus raising blood levels. Another theory is the release of cytokines with bone-resorbing effects are released from secondary tumors. Other practitioners recommend supplementation with calcium as some studies demonstrate an inverse relationship between calcium and cancer risk.
- Calcium supplementation may reduce lipid damage in the large intestine whereby inhibiting the formation of colon cancer.
- Reducing the damaging effects of bile acids and free-ionized fatty acids which have mutagenic effects upon the colonic mucosa; reduces hyperproliferative enterocyte changes

Germanium sesquioxide *Discuss with your compounding pharmacy*

- Inhibits tumor growth

B-Complex 1cc-2cc

Magnesium Citrate 2cc-10cc (200mg/mL)

- Magnesium levels are inversely correlated with cancer mortality and incidence

Selenium 2cc-10cc (40mcg/mL)

- Inversely correlated with cancer risk and incidence
- Inhibits carcinogenesis

- Reduces the damaging effects of chemotherapy
- Enhances vitamin E's anti-carcinogenic effects

Zinc Citrate 1cc-5cc (2.5mg/mL)

- Deficiency and excesses have anti-tumor effects
- Replaces cadmium and possibly other metals reducing their cancer causing effects

Cysteine 1cc-10cc (100mg/mL)

- Required for detoxification
- Powerful antioxidant effects
- Precursor to glutathione
- Reduces the toxicity of chemotherapeutic drugs

Arginine 1cc-5cc (100mg/mL)

- Retards tumor growth via immune stimulation

Tyrosine 1cc-5cc (100mg/mL)

- It is wise to check tyrosine levels by urine or blood as some studies suggest that low levels of tyrosine may inhibit tumorogenesis and metastasis

NOTES

Candida (yeast)

	Low Dose	High Dose
IV solution (cc)	**220 SW**	**400 SW**
Estimated Osmolarity (mOsm/L)	**320**	**313**
Time of IV Infusion:	**1hr**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Lipoic acid 2cc-20cc (100mg/mL)

- Antifungal, viral, parasitic and bacterostatic effects

Riboflavin-5-phosphate (B2) 1cc-20cc (50mg/mL)

- Commonly low in those with candida based on red blood cells glutathione reductase activity
- Requirement may increase during infections in general

Panthothenic acid (B5) 1cc-6cc (100mg/mL)

Pyridoxine Hydrochloride (B6) 1cc-6cc (100mg/mL)

- Blood levels of pyridoxyl-5-phosphate, the active form of B6, are commonly found low in those with candida.
- Levels may be increased in infection in general
- Ascorbic Acid 5cc-50cc (500mg/mL)
- Improves leukocyte function
- May act as a prooxidant which has anti-fungal effects
- The antioxidant effects of vitamin C stimulates humoral cytotoxic killing effects

Iron

- *Should probably not be supplemented in fungal infections unless the detrimental effects of iron anemia outweigh the potential of fungal-stimulation via iron supplementation. Research in this area is conflicting and thus clinical decisions, as always, should be based on each individual patient.*

Magnesium Citrate 1cc-10cc (200mg/mL)

- May be the most common deficiency in candida infection

Selenium 2cc-6cc (40mcg/mL)

- Deficiency of selenium probably predisposes to candida infection
- Reduced levels of selenium in the plasma (and not the red blood cells) are associated with candida
- Selenium levels may increase during infection

Biotin 1cc-5cc (1000mcg/mL)

- Biotin deficiency may perpetuate the transformation of candida into a more pathogenic fungal state and form

Cysteine 1cc-6cc (100mg/mL)

- Some theorize that carbon sources such as cysteine will perpetuate the growth of candida. I believe it is more likely that supplementation of cysteine is actually enhancing the bodies ability to fight infection as overall metabolism directed towards the infection fighting process requires such molecules. Also, the glutathione enhancing effects of cysteine, its effect upon enhancing cell-mediated immunity (chemotaxisis and phagocytosis) outweigh the above concern.

Panthethine 1cc-5cc (25mg/mL)

- Derived from pantothenic acid and is a direct precursor of coenzyme A

Multimineral	1cc-2cc

NOTES

Chronic Fatigue Syndrome

	Low Dose	High Dose
IV solution (cc)	220 SW	475 SW
Estimated Osmolarity (mOsm/L)	302	328
Time of IV Infusion:	1hr	1,1/2hr
Continued Therapy:	1-3/wk for 4-6 wks and reevaluate	
Comments:	Appropriate dietary, oral supplement	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic acid	5cc-20cc (500mg/mL)
B12 (IM)	1cc-6cc (1000mcg/mL)
Folic Acid	
Pantetheine	1cc-2cc (50mg/mL)
Riboflavin-5-phosphate (B2)	1cc-10cc (50mg/mL)
Magnesium Citrate	1cc-10cc (200mg/mL)

- Symptoms of CFS are quite similar to magnesium deficiency
- Red and white blood cells levels are sometimes low (especially white blood cell levels which reflect a longer duration of deficiency compared to red cells)
- Required coenzyme for hundreds of metabolic reactions

CoQ10 (IM)	1cc-2cc (25mg/mL)
Pyridoxine Hydrochloride (B6)	1cc-6cc (100mg/mL)

- Required coenzyme for hundreds of metabolic reactions

- Synergist of magnesium

Reduced Glutathione 1cc-10cc (100mg/mL)

- Antioxidant effect
- Immune enhancing effects
- Antiviral, fungal, bacterial and parasitic effects
- Helps shunt magnesium into cells

NADPH *Contact your compounding pharmacist*

NOTES

Detoxification

	Low Dose	High Dose
IV solution (cc)	150 SW	400 SW
Estimated Osmolarity (mOsm/L)	290	301
Time of IV Infusion:	45min-1hr	1,1/2hr
Continued Therapy:	1-3/wk for 4-6 wks and reevaluate	
Comments:	Appropriate dietary, oral supplement	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic acid 5cc-20cc (500mg/mL)

Glycine 2cc-10cc (50mg/mL)
Important factor for liver conjugation of toxins in the liver and intestine

Cysteine 2cc-10cc (50mg/mL)
Important factor for liver conjugation of toxins in the liver and intestine

Glutathione 2cc-10cc (100mg/mL)
Important factor for liver conjugation of toxins in the liver and intestine

CoQ10 2cc-4cc (25mg/mL)

Pyridoxine Hydrochloride (B6) 2cc-6cc (100mg/mL)

Pantothenic acid (B5) 2cc-6cc (100mg/mL)

- Provides adrenal gland support for detoxification

CoQ10 (ubiquinone)	2cc-4cc (25mg/mL)
Magnesium Chloride	2cc-3cc (200mg/mL)

Important coenzyme for hundreds of metabolic reactions

Superoxide Dismutase	1cc-5cc (10mg/mL)
B-complex	1cc-2cc

NOTES

Diabetes

	Low Dose	High Dose
IV solution (cc)	**175 SW**	**500 SW**
Estimated Osmolarity (mOsm/L)	**296**	**373**
Time of IV Infusion:	**45min**	**1 1/2hr-2hrs**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Magnesium Chloride 2cc-10cc (200mg/mL)

- May benefit proliferative retinopathy
- Most common deficiency among diabetics
- Cofactor for hundreds of metabolic enzymes along with pyridoxyl-5-phosphate

B-complex 1cc-3cc

- Niacin is a component of glucose tolerance factor which is required for proper sugar balance
- Niacin may improve glucose tolerance

Multimineral 1cc-3cc

- Copper supplementation may improve glucose tolerance
- Copper and zinc may antagonize iron and help reduce serum ferritin levels (if elevated). Elevated ferritin levels if reduced can improve cholesterol levels, triglycerides, hemoglobin A1c and blood sugar levels

Thiamin Hydrochloride (B1) 1cc-3cc (100mg/mL)

- Forms thiamin diphosphate which is involved in a direct oxidative pathway

- Helps diabetic neuropathy
- Decreases the symptoms of diabetic neuropathy

Pyridoxine Hydrochloride (B6) 1cc-6cc (100mg/mL)

- Commonly deficient in diabetics
- May help reduce symptoms of diabetic neuropathy
- May cure gestational diabetes
- May inhibit the formation of glycosylated hemoglobin; H1Ac is a well-accepted marker of glucose metabolism and cellular damage as a result of the Browning Reaction which may take place between hemoglobin and glucose forming glycosylated hemoglobin; the formation of glycosylated hemoglobin is non-enzymatic and inhibiting its formation will improve oxygen delivery to cells
- Suboptimal B6 is associated with insulin resistance and a rise in insulin

B12 (IM) 1cc-10cc (1000mcg/mL)

- Deficiency may lead to neuropathy (peripheral)
- Deficiency may lead to sensory impairment
- Deficiency may lead to ineffective myelin repair/production
- Deficiency may result in wasting of muscle
- Deficiency may raise urinary methylmalonic acid
- The cyanocobalamin and methylcobalamin forms seem equally effective

Ascorbic Acid 5cc-60cc (500mg/mL)

- Low levels are common in leukocytes of diabetic patients in spite of oral supplementation
- Deficiency can result in glyco-dysregulation
- Vitamin C deficiency is common in diabetics

- The oxidized form of ascorbic acid, dehydroascorbic acid (DHAA), is similar in chemical composition to alloxan which causes diabetes in rats
- High levels of DHAA have been found in diabetes relative to ascorbic acid levels
- Angiopathy, atherosclerosis, capillary fragility and other findings common in diabetes are molecularly oxidation-based and could benefit from the anti-oxidant effects of ascorbic acid
- Supplementation of vitamin C are known to cause false glucose levels in the urine and false positive-Guiac (occult blood) in the stool
- Supplementation may improve cholesterol and triglyceride levels

Calcium Gluconate 2cc-10cc (98mg/mL)

- Calcium deficiency may actually cause diabetes by perpetuating a secondary hyperparathyroidism and a shift of calcium into soft tissues such as the breast, joint hylain cartilage and the coronary arteries; hypertension and atherosclerosis could be side-effects. Overall cellular function dyregularion can develop interfering with the intra and extracellular exchange of calcium. Calcium supplementation may help reduce the secondary hyperparathyroidism
- Serum levels of ionized calcium are reduced in diabetics

Chromium 1cc-4cc (4mcg/mL)

- An essential component of glucose tolerance factor. Supplemental chromium improves glucose uptake by cells by improving insulin-sensitivity
- Serum chromium is often correlated with insulin levels
- May improve diabetic neuropathy if supplemented

Molybdenum 1cc-2cc (25mg/mL)

Magnesium Gluconate 1cc-10cc (200mg/mL)

- Decreased levels are associated with complications of diabetes
- Deficiency will negatively affect insulin sensitivity
- Deficiency impairs the release of insulin from the pancreatic beta-cells
- Ketoacidosis (acute) is known to be the primary cause of secondary low magnesium in diabetics (hypomagnesemia)
- Glycosuria can result in low magnesium levels
- Impairment of adrenaline secretion
- Impaired pyridoxine metabolism
- Impaired vitamin D metabolism
- Deficiency is associated with all of the major complications of diabetics: ophthalmic, neurological, renal, metabolic, musculoskeletal, cardiovascular

Manganese Chloride 1cc (250mcg/mL)

- Levels are frequently one-half those of non-diabetics
- Glycolytic enzymes require manganese
- Glucose intolerance can be reversed with manganese supplementation

Zinc Chloride 2cc-6cc (2.5mg/mL)

- Intestinal malabsorption often occurs in diabetics
- Levels of zinc in platelets, lymphocytes, granulocytes and in the plasma is often found
- Urinary levels are often increased
- Deficiency of zinc alters adversely fat and carbohydrate metabolism

Strontium 1cc (1mg/mL)

- Reduces insulin insensitivity

Vanadium .25 (1mg/mL)

- Reduces insulin insensitivity

Biotin 1cc-3cc

- May work with insulin helping to lower blood sugar
- May help diabetic neuropathy

CoQ10 (IM for 1cc, IV for two and above) 1cc-2cc (30mg/mL)

- Blood levels of ubiquinone are often reduced
- Activates peripheral glucose metabolism and insulin synthesis

Reduced Glutathione 1cc-10cc (100mg/mL)

- Important to regenerate oxidized antioxidants such as dehydroascorbic acid (oxidized ascorbic acid)
- Glutathione is made of cysteine, which is a powerful antioxidant and detoxifier; glutamic acid and glycine; glycine is required for deconjugation of toxic metabolites.

Selenium 1cc-4cc (40mcg/mL)

- Along with other antioxidants may help reverse retinopathy

NOTES

Eczema/Psoriasis

	Low Dose	High Dose
IV solution (cc)	**125 SW**	**450 SW**
Estimated Osmolarity (mOsm/L)	**309**	**317**
Time of IV Infusion:	**30min**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic Acid 5cc-20cc (500mg/mL)

- May improve eczema by modulating immune function particularly by reducing the production of inflammatory cytokines

Folic acid (IV) 1cc-4cc (5mg/mL)

- Often deficient in psoriasis

Hydroxy or Cyanocobalamine (B12) .25cc (1000mcg/mL)

- Subcutaneous injection directly into lesions may be of benefit and produce rapid lesion regression
- Intramuscular injections of 1mcg-10mcg twice per month for several months. 1000mcg delivered IM over thirty injections may be necessary

Pantethenic Acid (B5) 2cc-4cc (100mg/mL)

Pyridoxine Hydrochloride (B6) 2cc-4cc (100mg/mL)

B-Complex 1cc-2cc

Zinc Citrate 1cc-3cc (2.45mg/mL)

- Supplementation may reduce elevated copper levels which have been found elevated in some with atopic eczema
- Supplementation may reduced stored iron (serum ferritin) which has been found elevated in some with atopic eczema
- Copper and iron may be elevated and can be reduced with various chelators including calcium, magnesium, EDTA, DMSA, DMPS, and zinc
- Erythrocyte, dermal and neutrophil levels may be reduced

Selenium 1cc-6cc (40mcg/mL)

- May elevate tissue levels of glutathione peroxidase
- Required mineral for glutathione peroxidase which is an inhibitor of 5-lipoxygenase which promotes synthesis of inflammatory leukotrienes
- Selenium levels may be reduced in eczema
- Subcutaneous injections of .25 mg (40mg/mL) in and around psoriatic or eczematic lesions

Biotin 2cc-10cc (50mg/mL)

Reduced Glutathione 1cc-2cc (100mg/mL)

Gingko biloba (subcutaneoous) 1cc-3cc (50mg/mL)

- Subfractions of Ginko known as Fraction A, B and C (particularly fraction B) have been shown to possess anti-inflammatory activity

NOTES

Fatigue

	Low Dose	High Dose
IV solution (cc)	**125 SW**	**500 SW**
Estimated Osmolarity (mOsm/L)	**313**	**332**
Time of IV Infusion:	**30-45min**	**2hrs**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

B-Complex 1cc-3cc

- Required for ATP production
- Folic acid deficiency can cause a subclinical or clinical macrocytic (megaloblastic) anemia and fatigue

Pantothenic acid (B5) 2cc-6cc (100mg/mL)

- Fatigue is in fact the most common symptom of B6 deficiency along with depression and insomnia
- Required for the production of adrenal hormones

Hydroxy or Cyanocobalamin (B12) 1cc-5cc (1000mcg/mL)

- Deficiency can result in a macrocytic (megaloblastic) anemia and fatigue
- Levels are best evaluated by morphological findings; the combined findings of hypersegmented neutrophils and macrocytosis (enlarged red blood cells) is most often B12 deficiency more often than folate deficiency. Lab evaluation should include serum B12 and folic acid and red blood cell folic acid for ideal differentiation between the two nutritional anemia's

Ascorbic Acid 5cc-40cc (500mg/mL)

- As an antioxidant vitamin C helps maintain red blood cell membrane function

Pyridoxine Hydrochloride (B6) 2cc-6cc (100mg/mL)

- Required along with magnesium for literally hundreds of enzyme reactions
- Pyridoxyl-5-phosphate is required in the bone marrow for the production of the hemoglobin molecule
- Useful for B6-responsive anemia

Riboflavin-5-phosphate (B2) 5cc-10cc (50mg/mL)

- Reduces neuromuscular irritability

Reduced Glutathione 1cc-6cc (100mg/mL)

- Required for the proper function of the Hexosmonophosphate Pump required for hemoglobin production
- Glutathione is important for hemoglobin production by way of the HMP pathway (Hexose Monophosphate Shunt)

Amino Acid Mixture 8.5% intravenous infusion

- Useful for a protein responsive anemia
- Protein, or more correctly stated – amino acid deficiency, can result in fatigue

Iron

- *Supplement orally only when deficient. Occasionally severe iron anemic patients will visit your office. Typically, they have already visited a hematologist that has recommended either*

oral iron with or without intravenous iron or a hemoglobin production promoter

Magnesium Chloride 1cc-10cc (200mg/mL)

- Required for the production of adenosine triphosphate (ATP)
- Required for the shuttling of potassium intracellularly

Zinc Chloride 1cc-3cc

- Deficiency is associated with poor zinc status

Arginine 1cc-3cc (100mg/mL)

- Improves aerobic metabolism
- Improves growth hormone production a deficiency of which can cause lethargy

Tyrosine 1cc-2cc (100mg/mL)

- Required for the synthesis of thyroid hormone

NOTES

Fibromyalgia/Muscle Cramps/Myopathy

	Low Dose	High Dose
IV solution (cc)	**150 SW**	**500 SW**
Estimated Osmolarity (mOsm/L)	**300**	**373**
Time of IV Infusion:	**30min**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic Acid	5cc-20cc (500mg/mL)
B-Complex	1cc-2cc
Multitrace	1cc-2cc
NADPH	*Contact your compounding pharmacist*

Thiamin Hydrochloride (B1) 1cc-3cc (100mg/mL)

- Sometimes found deficient in fibrositis and arthritis
- Riboflavin-5-phosphate 5cc-15cc (50mg/mL)
- Reduces muscle irritability and cramping/spasm
- Improves mitochondrial function by improving FADH production

Riboflavin-5-phosphate (B2)	1cc-10cc (50mg/mL)
Pantothenic Acid (B5)	2cc-4cc (100mg/mL)
Multimineral	1cc-3cc

- Containing zinc, copper, chromium, selenium and manganese
- Mineral supplementation will improve overall muscle length and relaxation

Pyridoxine Hydrocholoride 1cc-6cc (100mg/mL)
- Supplementation may improve tingling, pain, weakness and numbness

CoQ10 (ubiquinone) 1cc-2cc (25mg/mL)

Hydroxy or Cyanocobalamin (B12) 1cc-3cc (1000mcg/mL)
- Relieves night cramps sometimes referred to as "growing pains"

Calcium Gluconate 1cc-10cc (98 mg/mL)
- Imbalances in calcium metabolism can cause leg cramps

Magnesium Glycinate 1cc-10cc (200mg/mL)
- Deficiency is associated with muscle spasms and tripper points
- Cofactor for hundreds of enzyme reactions
- Often deficient in fibrositis

Ascorbic Acid 5cc-40cc (500mg/mL)
- Improves mitochoncrial supplementation

Selenium 1cc-6cc (40mcg/mL)
- May reduce atrophy and overall muscle tone
- Deficiency may result in muscle pain

L-Carnitine 1cc-4cc (50mg/mL)
- May improve muscle strength

CoQ10 (ubiquinone) 1cc-4cc (30mg/mL)

- Improves mitochondrial function
- Improves muscle degeneration, strength and neurologic function

Phosphatidyl choline 1cc-3cc (50mg/mL)

- May reduce muscular degeneration
- Cell membrane stabilizer

NOTES

Gout

	Low Dose	High Dose
IV solution (cc)	**100 SW**	**450 SW**
Estimated Osmolarity (mOsm/L)	**324**	**287**
Time of IV Infusion:	**30min**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Folic acid (IV or IM) 1cc-5cc (1000mcg/mL)

- Folic acid inhibits the enzyme xanthine oxidase which is needed to produce uric acid
- High doses of folic acid has been shown to inhibit uric acid production with greater safety than colchicine or allopuranol

Thiamin Hydrochloride (B1) 2cc-3cc (100mg/mL)

- Effective for pain management

Ascorbic Acid 5cc-40cc (500mg/mL)

- Increases the renal excretion of uric acid

Zinc Citrate 1cc-3cc

- Plasma levels often fall during gout attacks (exacerbation's)

D-L-Phenylalanine 2cc-4cc (50mg/mL)

- Effective for pain management

NOTES

Headaches/Migraines

	Low Dose	High Dose
IV solution (cc)	**250 LR**	**200 SW**
Estimated Osmolarity (mOsm/L)	**317**	**273**
Time of IV Infusion:	**1hr**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Pyridoxine Hydrochloride (B6) 2cc-6cc (100mg/mL)

- Headaches resulting from depleted serotonin could benefit from B6 supplementation to enhance serotonin levels via B6-mediated pathways
- Assists the utilization of magnesium and its antispasmotic effects

Magnesium Citrate 2cc-10cc (200mg/mL)

- Low RBC or WBC magnesium is often associated with premenstrual headaches
- Magnesium causes muscle relaxation
- Commonly low in preeclampsia which often occurs with migraines
- Migraine suffers respond well to IV administration
- Commonly serves as an enzyme cofactor along with B6

Reduced Glutathione 1cc-6cc (100mg/mL)

- Helps shuttle magnesium into cells

Riboflavin- 5-phosphate (B2) 5cc-10cc (50mg/mL)

- Enhances the production of FADH required for energy production and specifically for mitochondrial energetics (found to be deficiency in migraine suffers)

NOTES

Heart Disease/Peripheral Vascular

	Low Dose	High Dose
IV solution (cc)	**200 SW**	**450 SW**
Estimated Osmolarity (mOsm/L)	**322**	**441**
Time of IV Infusion:	**1hr**	**1 ½-2hrs**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Folic acid 1cc(5 mg/mL)

- Coenzyme for the conversion of homocysteine enhancing the remethylation process of homocysteine to methionine. Homocystine enhances the formation of atherogenic lesions.

Ascorbic acid 5cc-20cc (500mg/mL)

- White blood cell ascorbic acid levels are often reduced in heart disease
- Plasma levels of white blood cells are often reduced in heart disease
- The enzyme cholesterol-7-alpha-hydroxylase, which produces bile acids, is vitamin C dependant; deficiency of C can increase cholesterol deposition in a variety of cardiovascular tissues and shift the ratio of HDL to cholesterol
- Vitamin C activates lipoprotein lipase necssary for triglyceride catabolism
- Ascorbic acid is needed for the hydroxylation reaction to proline required for repair of the arterial wall
- Plasma levels may be inversely proportional to angina
- Plasma levels are often inversely proportional to CVD in general

- Low vitamin C levels often increase HDL cholesterol
- Supplementation has been shown to improve peripheral arterial circulation

B12(IM) 1cc-3cc (1000mcg/mL)

- Low levels associated with increased homocysteine levels

Pantothenic acid (B5) 1cc-3cc (100mg/mL)

B-complex 1cc-2cc

Pyridoxine Hydrochloride (B6) 1cc-3cc

- Deficiency enhancing the occurrence of atherogenic lesions
- Levels drop during acute state of myocardial infarction
- Inhibits platelet activation
- Reduces intravascular coagulation
- Converts the toxic homocysteine molecule to cystathionine. Homocysteine has been shown in high amounts in the blood of those with cardiovascular disease

Calcium Gluconate 2cc-10cc

- Calcium deficiency may cause atherosclerosis
- Deficiency is associated with disregulation of cell membrane function and intracellular accumulation of calcium
- Administration of calcium may decrease triglycerides and reduce platelet aggregation

Magnesium Chloride 2cc-10cc(200 mg-2000mg)

- Low levels associated with CAD
- Magnesium loading tests often show that those with MI retain more magnesium than placebo groups suggesting a greater need for magnesium
- Serum levels are often lower in those having had an MI

- Deficiency is associated with an increased risk of sudden cardiac death, MI, and CAD
- Magnesium lowers blood pressure
- Supplementation may prevent calcification of blood vessels and other tissues; calcification of the carotid arteries, coronary arteries and even calcification of breast tissues have been shown to increase the risk of heart disease
- Supplementation reduces platelet aggregation and HDL-cholesterol
- When administered along with potassium improves myocardial function better than either one alone
- Helps correct certain types of arrhythmia's
- Natural calcium-channel blocker
- Often deficiency in those with peripheral vascular disease

Potassium Chloride 1cc (10mEq/mL)

Selenium 1cc-5cc (40mcg/mL)

- Serum, toenail and red blood cells levels seem to be inversely correlated with myocardial infarction risk and atherosclerosis
- Selenium levels correlate with polyunsaturated fat levels
- Selenium is a potent antioxidant which reduces oxidative degeneration of cardiovascular tissue
- Deficiencies are often correlated with raised LDL levels
- Selenium may raise prostacyclin production reducing platelet aggregation
- Administration post-MI improves prognosis
- Administration reduces angina

Taurine 1cc-4cc (100mg/mL)

- Intracellular myocardial taurine levels increase arrhythmia's of myocardial ischemia
- Helps stabilize platelets thus reducing platelet aggregation

- My improve cholesterol metabolism
- Reduced calcium accumulation in the aorta and myocardium thus improving calcium metabolism and reducing artherosclerotic progression

Coenzyme Q10 (IM or IV) 1cc-2cc (25mg/mL)

Pantethine 1cc-3cc(100-300 mg)
- May lower cholesterol and triglyceride levels

Niacin 1cc (100mg)

Chromium 1cc-6cc(40mcg/mL)

Zinc Citrate 1cc-3cc (2.5mg/mL)
- May increase alpha-lipoproteins which are favorable for CAD
- May increase HDL levels
- May lower copper levels so copper may need to be supplemented
- Supplementation may reduce intermittent claudication

Arginine 2cc-6cc (100mg/mL)
- Helps corrects endothelial microcirculation repair and function

Carnitine 200-750 mg
- May prolong the time it takes for coronary insufficiency to develop by increasing myocardial energy expenditure

Pantethine 1cc-3cc (50mg/mL)

CoQ10 (above 1cc administer IV) 1cc-3cc (25mg/mL)
- Lipid soluble antioxidant

- Reduces blood viscosity
- Improves overall myocardial function
- Seems to protect the myocardial tissues from oxidative damage during bypass surgery
- Serum levels are often lower in those with CVD
- Low chromium levels may raise the level of blood fats
- May benefit those with supraventricular tachyarrhythmias and ventricular premature beats

Pyridoxine Hydrochloride (B6)	2cc-4cc (100mg/mL)
Multimineral	1cc-3cc

NOTES

Hepatitis/General Anti-Viral

	Low Dose	High Dose
IV solution (cc)	400 SW	1000 SW
Estimated Osmolarity (mOsm/L)	301	460
Time of IV Infusion:	1-1 1/2hrs	2-1/2-3hrs
Continued Therapy:	1-3/wk for 4-6 wks and re-	

evaluate. Appropriate dietary, oral supplement and medical tests should be performed and coordinated with intravenous recommendations.

Comments: See, *Hope for Hepatitis C: A Personal Guide for Healing and Empowerment - Nutritional and Natural Solutions*. This book outlines in great detail the full hepatitis C protocol (the recommendations below are minimum). Available at your local bookstore or call: Optimal Health Press, Inc. at 914-666-2943

Ascorbic Acid 10cc-75cc (500mg/mL)

- Modulates humor and cellular immunity
- Reduces the oxidative damage of various tissues

Glycine 40cc (50mg/mL)

- Required for the conjugation of toxins in the liver

Cysteine 2cc-10cc (50mg/mL)

- Direct antiviral effects
- Required for conjugation of toxins
- Demonstrated in studies to decrease viral loads

Glycerretic acid 25cc (8mg/mL)

- Power antiviral effects particularly against hepatitis C

- Note: The combination of glycine, glycerretic acid and cysteine are given in the dosages stated above in 150 cc's of Normal Saline to obtain the most favorable osmolarity. The

use of these three substances in addition some of the others in this section would require a change to sterile water. It is recommended that the practitioner carefully calculate the osmolarity of all solutions as they should fall within a range of 260-380 milliosmoles. Those with hypertension may worsen their blood pressure. As with all supplement recommendations, careful of the patient's overall health status is important.

Glutathione 1cc-10cc (100mg/mL)

Zinc gluconate 1cc-3cc (2.5mg/mL)
- Modulates immune function

Multimineral 1cc-2cc

Lipoic acid 1cc-15cc (100mg/mL)
- Possess direct anti-viral effects

B Complex 1cc-3cc

Pyridoxine Hydrochloride (B6) 1cc-6cc (100mg/mL)
- Helpful for normalizing SGOT, GGT and SGPT levels

Pantothenic acid (B5) 1cc-6cc (100mg/mL)
- Provides adrenal gland support

Magnesium Glycinate 1cc-10cc (200mg/mL)

Calcium Gluconate 1cc-10cc (9.8mg/mL)
- Calcium blood levels may be elevated, but negative parathyroid
- feedback mechanism can result from supplementation of this
- mineral helping to normalize calcium metabolism

Hydroxy or Cyanocobalamin (B12 - IM only) 1cc-10cc (1000mcg/mL)

- Serum levels do not always reflect the increased need for, or hepatic difficulties, in metabolizing B12
- Commonly serum levels show high B12 levels even though this finding often reflects impaired hepatic utilization of B12. Others theorize that the hepatitis A,B or C virus may denature receptor sites on the intrinsic factor molecule itself or at the cellular membrane
- Alcoholic hepatitis commonly results in low levels of B12 and or folic acid
- B12 levels, when high, are an accepted morbidity and mortality indicator

Folic acid (IV) 1cc-3cc (500mcg/mL

Taurine 1cc-4cc (100mg/mL)

- May be helpful in reducing bilirubin levels if elevated. This effect may be due to the enhanced production of the bile acid taurocholic acid
- Sulfur containing amino acid required for the liver's conjugation of toxins
- Antioxidant functions help regulative degenerative stress

Sylimarin (milk thistle) *Contact your compounding pharmacist*

NOTES

Hypertension

	Low Dose	High Dose
IV solution (cc)	**250 LR**	**350 SW**
Estimated Osmolarity (mOsm/L)	**323**	**300**
Time of IV Infusion:	**1hr**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Magnesium Citrate 1cc-15cc (200mg/mL)

- Hypomagnesemia or subclinically low magnesium is commonly associated with hypertension and increased blood pressure
- Patients taking blood pressure medications respond best with adequate magnesium status
- Potentates the blood pressure lowering effects of calcium and phosphorus

Calcium Gluconate 2cc-15cc (9.8mg/mL)

- Urinary loss may be inversely proportional to blood pressure
- Deficiency is associated with increased blood pressure
- Low serum levels are correlated with hypertension
- Plasma calcium levels may be inversely correlated with blood pressure

Reduced Glutathione 1cc-10cc (100mg/mL)

Pyridoxine Hydrochloride (B6) 2cc-6cc(100mg/mL)

- Works synergistically with glutathione and magnesium

Selenium 1cc-6cc (40mcg/mL)

- Low levels are found in many hypertensives
- Selenium supplementation can lower both diastolic and systolic pressures

Zinc Citrate 1cc-3cc

- Red blood cells levels may be elevated possibly suggesting compartmentalization within RBCs. Supplementation can increase both plasma and serum levels
- Zinc helps offset the deleterious blood pressure raising effects of cadmium (rule out cadmium toxicity)

Arginine 1cc-3cc (100mg/mL)

Taurine 1cc-4cc (100mg/mL)

- Sulfur amino acids such as taurine are inversely correlated to systolic pressure

NOTES

Immune Disorders
Lupus
*Multiple Sclerosis * Neuromuscular Degeneration * Rheumatoid Arthritis * Scleroderma * Raynaud's Syndrome/Phenomenon

	Low Dose	High Dose
IV solution (cc)	**400 SW**	**500 SW**
Estimated Osmolarity (mOsm/L)	**306**	**782**
Time of IV Infusion:	**1, 1/2hr**	**2-2 1/2hrs**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic acid 5cc-150cc (500mg/mL)

- Synergistic with selenium and other antioxidants
- Plasma levels are often reduced in rheumatoid arthritis
- Increased requirement in virtually all degenerative conditions

Selenium 1cc-6cc (40mcg/mL)

- Increases glutathione peroxidase levels in erythrocytes of M.S. and Lupus patients
- Soil levels may be inversely related to multiple sclerosis prevalence
- Plasma/serum levels are often reduced in rheumatoid arthritis

Thiamin Hydrochloride (B1) 1cc-4cc(100mg/mL)

- Intraspinal injections may often transient, but dramatic, improvements in pain and other central nervous system symptoms in M.S patients

Pyridoxine Hydrochloride (B6) 2cc-4cc (100mg/mL)

- Deficiency may impair the detoxification of carbon monoxide known to cause demylination. The prevalence of MS is higher in regions with higher carbon monoxide pollution
- Deficiency may actually predispose one to developing multiple sclerosis
- Intravenous B6 has shown promise for suffers of amyotrophic lateral sclerosis
- Cofactor for magnesium

Folic acid 1cc-3cc (5mg/mL)

- Deficiency is known to contribute to subacute combined degeneration of the spinal cord which creates demylination

B-Complex 1cc-2cc

Hydroxycobalamin (IM) 1000mcg-10,000mcg

- Deficiency may actually predispose one to developing multiple sclerosis
- Normalizes high MCV (mean corpuscular volume)
- Normalizes high MCHC (mean corpuscular hemoglobin concentration
- Improves white blood cell maturation in the bone marrow
- Improves red blood cell maturation in the bone marrow
- Improves maturation of thrombocytes (platelets) in the bone marrow
- Required for myelin synthesis
- Helps normalize high homocystine which is an inflammatory chemical
- Corrects pernicious anemia (with ongoing supplementation)
- Deficiency is known to contribute to subacute combined degeneration of the spinal cord which creates demylination

Multimineral 1cc-3cc

Calcium Gluconate 1cc-8cc (98mg/mL)

- Required for the repair and synthesis of myelin
- Inadequate intake during puberty may allow for breakdown of lipid membranes and faulty myelin synthesis
- Deficiency may predispose to multiple sclerosis in the first place

Copper 2mcg

- Deficiency is thought to predispose to faulty myelination
- Hair levels are often depressed in M.S patients
- The storage form of copper, ceruloplasm, may be elevated in M.S.

Nicotinamide (B3) 20mg

- Helps improve skin lesions in lupus patients
- Intravenous administration has been shown to rapidly reduce the skin lesions of lupus erythematosis (as little as 20mg of *niacin*)

Magnesium Chloride 2cc-10cc (200mg/mL)

- Deficiency may cause vasospasm

Pantothenic Acid (B5) 2cc-6cc (100mg/mL)

- Supportive of the adrenal glands
- Helps relapses in lupus and multiple sclerosis patients
- Inverse correlation between pantothenic acid levels are rheumatoid arthritis

Zinc Citrate 1-20mg (2.5mg/mL)

- Levels should be supplemented, particularly during exacerbation's as levels seem to drop in the erythrocyte membrane
- Abnormal compartmentalization of zinc may occur in multiple sclerosis
- Serum zinc is often low in rheumatoid arthritis
- Supplementation may actually reduce the activity of rheumatoid arthritis

Taurine 1cc-3cc (100mg/mL)

- Sulfur oxidation and S-methylation is often impaired in those with lupus, rheumatoid arthritis and multiple sclerosis

Cysteine 1cc-10cc (100mg/mL)

- Sulfur oxidation and S-methylation is often impaired in those with lupus, rheumatoid arthritis and multiple sclerosis

Glycine 2cc-30cc (50mg/mL)

- An increase in plasma glycine has been found in some neurodegenerative diseases that might indicate poor cellular utilization.

CoQ10 (ubiquinone) 1cc-3cc (25mg/mL)

- Supplementation has shown benefit for a number of neuromuscular disorders

NOTES

Infection

	Low Dose	High Dose
IV solution (cc)	**125 SW**	**500 SW**
Estimated Osmolarity (mOsm/L)	**295**	**340**
Time of IV Infusion:	**1hr**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic acid 5cc-20cc

- Infections in general may reduce cell uptake of vitamin C
- Vitamin C enhances both humor and cellular immunity and stimulate neutrophil chemotaxisis and phagocytosis

Pantothenic acid (B5) 2cc-4cc (100mg/mL)

- Deficiency may impair the immune response and increase susceptibility to infections

Magnesium Chloride 2cc-10cc (200mg/mL)

- Low magnesium nutriture compromise one's ability to fight infection

Multimineral 2cc-3cc

Selenium 1cc-4cc (65mcg/mL)

- Deficiency is associated with an increased susceptibility to infections
- Increases the production of glutathione peroxidase benefiting immunity

Reduced Glutathione 1cc-10cc (100mg/mL)

- Important tripeptide for immune function and one's resistance and recovery from infection

Zinc Citrate 1cc-4cc

- Deficiency may increase susceptibility to infections
- Zinc enhances leukocyte chemotaxis

Lipoic acid 1cc-10cc

- Direct antifungal effects

NOTES

Neuropathy/Pain/Inflammation

	Low Dose	High Dose
IV solution (cc)	**125 SW**	**700 SW**
Estimated Osmolarity (mOsm/L)	**275**	**285**
Time of IV Infusion:	**1hr**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic Acid 5cc-20cc (500mg/mL)

- Gum-line sensitivity improves with supplementation
- Enhances the effects of analgesics in breast cancer patients or eliminates pain altogether (10-25 grams/IV)
- Some studies showed that cancer patients receiving as little as 10 grams/day achieved a reduction in pain
- Reduces painful muscle spasms

Hydroxy or Cyanocobalamin (B12 - IM) 1cc-10cc (1,000mcg/mL)
B12 can be compounded to contain 10,000 (ten thousand rather than 1000mcg/mL)

- Demonstrated to afford a dose-dependant analgesic effect in chronic pain suffers of many types (comparable to phenylbutazone)
- Specifically demonstrated to benefit vertebral pain, sensory disturbances and painful muscle spasms when delivered intramuscularly
- Those with degenerative neuropathy and cancer who received as much as 10,000 mcg/day for approximately two weeks reported disappearance or prompt relief of pain

- Deficiency is often associated with peripheral neuropathy in the absence of pernicious anemia
- Often deficient in neuromuscular degenerative conditions
- Deficiency is known to cause polyneuropathy
- Can benefit trigeminal neuralgia
- Can benefit bells palsy
- Can benefit multiple sclerosis
- Can benefit alcoholic neuropathy
- Possesses anti-inflammatory and analgesic effects

Ascorbic acid 5cc-40cc (500mg/mL)

- Inflammation in general creates increased oxidation of ascorbic acid. Vitamin C is necessary for collagen synthesis and repair
- A inverse relationship has been demonstrated between the degree of inflammation and vitamin C need

Folic acid (IV) 1cc-2cc (5mg/mL)

- Deficiency is often associated with peripheral neuropathy
- Often deficient in neuromuscular degenerative conditions
- Deficiency is known to cause polyneuropathy
- Can benefit trigeminal neuralgia
- Can benefit bells palsy
- Can benefit multiple sclerosis
- Can benefit alcoholic neuropathy

Thiamin Hydrochloride (B1) 1cc-20cc (100mg/mL)

- Large intravenous dosages have been demonstrated to block ganglionic transmission of painful neural stimuli to effector muscles
- Is an effective analgesic shown to both eliminate and reduce painful syndromes
- Deficiency is known to cause polyneuropathy

- Can benefit trigeminal neuralgia
- Can benefit bells palsy
- Can benefit multiple sclerosis
- Can benefit alcoholic neuropathy

Magnesium Citrate 2cc-4cc (200mg/mL)

Calcium Gluconate 2cc-4cc (98mg/mL)

Pyridoxine Hydrochloride (B6) 1cc-6cc (100mg/mL)

- Excessive vitamin B6 is thought by some to cause a sensory neuropathy over several years of supplementation. Hepatic inability to phosphorylate B6 is thought to be the cause. It is best to supplement P-5-P intravenously along with other B-vitamins to overcome the possibility, albeit unlikely, of causing a sensory neuropathy.
- In general produces effective analgesic effects
- B6 responsive neuropathy has been reported in the literature
- Increases pain thresholds and increases serotonin levels (two characteristics demonstrated in those with chronic pain syndromes)

Copper 1cc-4cc (0.4mg/mL)

- Deficiency can potentially lower enkephalin levels increasing pain perception

Selenium 1cc-6cc (40mg/mL)

- Deficiency or increased need has been associated with muscle pain
- Back and shoulder pain suffers often demonstrate reduced serum selenium levels

D-Phenylalanine 1cc-10cc (100mg/mL)

- Has been demonstrated to produce opiate receptor-mediated analgesic effects
- Supplementation may improve other methods of pain control including acupuncture analgesia
- Reduces muscle, nerve and joint pains
- Effective for headaches
- Has shown benefit for relieving chronic ischemic and pressure pain

Zinc Citrate 1cc-4cc (2.50mg/mL)

- May reduce certain types of neuropathy associated with a reduced nerve conduction velocity (NCV)
- An accumulation of superoxide radical, produced as a result of Cu,Zn superoxide dismutase metabolic function; this enzyme requires adequate zinc nutriture

NOTES

Osteoarthritis

	Low Dose	High Dose
IV solution (cc)	**125 SW**	**500 SW**
Estimated Osmolarity (mOsm/L)	**333**	**372**
Time of IV Infusion:	**1hr**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic acid 5cc-20cc (500mg/mL)

- Promotes cartilage and joint repair
- Anti-inflammatory effects

Thiamin Hydrochloride (B1) 1cc-6cc (100mg/mL)

- Supplementation impairs collagen synthesis

Pantothenic acid (B5) 1cc-6cc (100mg/mL)

- Has reversed pathological joint findings
- Supplementation has shown to increase the overall healing response

Magnesium Chloride 2cc-4cc (200mg/mL)

Selenium 1cc-6cc (40mg/mL)

- Low selenium levels promote inadequate blood levels of glutathione peroxidase (GP); GP levels have been found low in osteoarthritis

Cysteine 1cc-6cc (50mg/mL)

- Deficiency is known to contribute to subacute combined degeneration of the spinal cord which creates demylination
- Can reduce pain and joint effusion

Taurine 1cc-4cc (100mg/mL)

- Deficiency is known to contribute to subacute combined degeneration of the spinal cord which creates demylination
- Can reduce pain and joint effusion

Reduced Glutathione 1cc-4cc (100mg/mL)

- Deficiency is known to contribute to subacute combined degeneration of the spinal cord which creates demylination
- Can reduce pain and joint effusion

Glycosaminoglycan-peptide complex

- 2ml administered intramuscularly for ten to fifteen injections or 1ml intramuscularly for 30 injections administered within a three week period

CoQ10 (ubiquinone) 1cc-4cc (25mg/mL)

- Helps protect against oxidative, exercise-induced tissue injury

Glycosaminoglycan polysulfate

- 50 mg intramuscularly twice per week for fifteen injections

NOTES

Osteoporosis

	Low Dose	High Dose
IV solution (cc)	**100 SW**	**500 SW**
Estimated Osmolarity (mOsm/L)	**327**	**312**
Time of IV Infusion:	**1hr**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic acid 5cc-20cc (500mg/mL)

- Deficiency may cause osteoporosis

Boron 1cc-2cc (.25mg/mL)

- May promote calcium loss and precipitate demineralization of bone
- May enhance bone density (other studies have demonstrated)

Calcium Gluconate 2cc-15cc (98mg/mL)

- Supplementation helps promote positive calcium balance
- Low calcium levels stimulate parathyroid hormone production which in turn stimulates osteoclastic bone resorption

Magnesium Chloride 2cc-15cc (200mg/mL)

- Promotes alkaline phosphatase enzyme function which is involved in the formation of calcium crystals in bone
- Regulates parathormone (PTH)
- Magnesium deficiency is common in osteoporotic patients
- Intake may be inversely correlated with bone density
- Promotes calcium incorporation into bone

Manganese 1cc-5cc (.1mg/mL)

- A necessary factor for promoting bone mineral density

Folic acid (IV) 1cc-3cc (5mg/mL)

- Helps convert toxic homocysteine to the amino acid methionine. Homocysteine interferes with collagen crosslinking thus inhibiting bone matrix formation; the result is osteoporosis

Pyridoxine Hydrochloride (B6) 1cc-6cc (100mg/mL)

- Also enhances the conversion of homocysteine to cystathione

B12 (IM) 1cc-3cc (1000mcg/mL)

- Deficiency of B12 may interfere with osteoblastic bone activity

Zinc Chloride 1cc-4cc (2.45mg/mL)

- An essential mineral for bone mineralization and density

NOTES

Parkinson's/Dementia

	Low Dose	High Dose
IV solution (cc)	**125 SW**	**500 SW**
Estimated Osmolarity (mOsm/L)	**295**	**303**
Time of IV Infusion:	**1hr**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic acid 5cc-20cc (500mg/mL)

- May be reduced in the amygdaloid nucleus of parkinsonian brains
- Supplementation may reverse/improve the side-effects of L-dopa
- Has been demonstrated to improve hand coordination when given along with Levodopa
- Reduction in lipid peroxidation (from free radical activity or a reduction in endogenously derived neurotoxic substances) in the substantia nigra may be reduced
- Supplementation with antioxidants may delay the start of drug treatment
- Has heavy metal chelating ability (metals such as copper, iron, aluminum and mercury have been found high in a variety of body tissues including the brain and cord and cerebrospinal fluid. EDTA, D-penicillamine, DMSA and DMPS may also be of substantial use for removing and decompartmentalizing metals.

Magnesium Chloride 2cc-15cc (200mg/mL)

- Levels have been found reduced in the caudate nucleus

Manganese

- Inhalation exposure is stored in the basal ganglia. This nutritional factor should probably not be supplement in appreciable amounts

Reduced Glutathione 1cc-10cc (100mg/mL)

- Reduction in lipid peroxidation (from free radical activity or a reduction in endogenously derived neurotoxic substances) in the substantia nigra may be reduced
- Heavy metal chelating ability

N-acetylcysteine or cysteine 2cc-10cc (50mg/mL)

- Reduction in lipid peroxidation (from free radical activity or a reduction in endogenously derived neurotoxic substances) in the substantia nigra may be reduced
- Heavy metal chelating ability

Folic acid IV) 1cc-6cc (5mg/mL)

- Tetrahydrobiopterin, an important cofactor for tyrosine hydroxylase enzyme, potentates the metabolic conversion of the amino acid tyrosine to L-dopa. This enzyme is also copper dependant
- Deficiency of this B-vitamin is often associated with PD

Niacin 1cc (50mg/mL)

- Supplementation may increase brain L-dopa levels
- Enhances the production of NADH (nicotinamide adenine dinucleotide) an important coenzyme produced from niacin involved in L-dopa synthesis

NADH — Contact your compounding pharmacist

- Intravenous administration produced clinical improvements

Phenylalanine — 1-cc10cc (100mg/mL)

- Precursor to L-dopa

Pyridoxine Hydrochloride (B6) — 1cc-4cc (100mg/mL)

- B6 supplementation has been demonstrated to counteract L-dopa's effects unless L-Dopa is administered concurrently with carbidopa. B6 should not be given along with L-Dopa.
- Dopa decarboxylase and its P-5-P cofactor, catalyze L-dopa's conversion to dopamine
- Intramuscular B6 at 1-400mg daily dosages (total dosages between 3-6000mg) improved EMG findings, myotonometric and tremographic findings which were visually improved
- B6 may improve trembling, rigidity, cramps, fatigability, sleeping, appetite which have resulted from the idiopathic or arteriosclerotic type Parkinson's
- B6 and thiamin intraspinal injections (100mg/administration) demonstrated temporary relief from muscle rigidity (25mg of B6 and 10mg of thiamin)

- Note: L-Dopa is a large molecule and neutral amino acid that is competitively inhibited by methionine, phenyalanine, tryptophan and tyrosine. A very low protein diet should be recommended and intravenous use of these amino acids should be avoided. Some studies have shown however that L-dope reduces levels of L-methionine and that between 1-5 grams/day allowed for maximal improvement when methionine was given concurrently with L-dopa

NOTES

Premenstrual Syndrome (PMS)

	Low Dose	High Dose
IV solution (cc)	**250 SW**	**325 SW**
Estimated Osmolarity (mOsm/L)	**359**	**316**
Time of IV Infusion:	**1hr**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Ascorbic Acid 5cc-20cc (500mg/mL)

Pyridoxine Hydrochloride (B6) 1cc-6cc (100mg/mL)

- Required for hormone metabolism
- Required for amino acid deamination and transamination
- Cofactor for hundreds of enzyme reactions including many involved in behavior, energy and mood
- Helps maintain and normalize magnesium levels and is a common cofactor along with magnesium

Calcium Gluconate 2cc-10cc (98mg/mL)

- Helps maintain adequate calcium balance allowing for proper muscle tonicity

Magnesium Chloride 2cc-10cc (200mg/mL)

- Often reduced in the red blood cell
- Magnesium deficiency may reduce brain levels of dopamine which may be caused by excessive estrogen produced during the luteal phase of the menstrual cycle
- Deficiency reduces insulin secretion

- Required coenzyme for the delta-6-desaturase enzyme for essential fatty acid (both omega 3 and omega 6) desaturation

Selenium 2cc-4cc (40mcg/mL)

Zinc Citrate 1cc-4cc (2.45mg/mL)

- The luteal phase of the menstrual cycle may deplete zinc levels
- Required factor for delta-6-desaturase enzyme function

Tyrosine 1cc-10cc (100mg/mL)

- Helpful if the PMS sufferer has low tyrosine
- Tyrosine is a necessary molecule for thyroid hormone metabolism

Arginine 2cc-4cc (100mg/mL)

B-Complex 1cc-2cc

NOTES

Shingles

	Low Dose	High Dose
IV solution (cc)	75 SW	350 SW
Estimated Osmolarity (mOsm/L)	320	305
Time of IV Infusion:	1hr	1,1/2hr
Continued Therapy:	1-3/wk for 4-6 wks and reevaluate	
Comments:	Appropriate dietary, oral supplement	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Selenium	2cc-4cc (40mcg/mL)
B12 (IM)	1cc-5cc (1000mcg/mL)
Ascorbic Acid	5cc-20cc (500mg/mL)
Glycerretic Acid	10cc (8.5mg/mL)

NOTES

Ulcerative Colitis

	Low Dose	High Dose
IV solution (cc)	**125 LR**	**100 SW**
Estimated Osmolarity (mOsm/L)	**333**	**321**
Time of IV Infusion:	**1hr**	**1,1/2hr**
Continued Therapy:	**1-3/wk for 4-6 wks and reevaluate**	
Comments:	**Appropriate dietary, oral supplement**	

and medical tests should be performed and coordinated with intravenous recommendations. Potential drug-nutrient interactions should be explored.

Folic acid (IV) 1cc-4cc (5mg/mL)

- Often deficient due to immune degeneration of the colon resulting in malabslrption

Pantothenic acid (B5) 1cc-6cc (50mg/mL)

- Intravenous supplementation bypasses faulty conversion of coenzyme A in the colon

Calcium Gluconate 2cc-10cc (98mg/mL)

- Often deficient due to absorption difficulties, corticosteroid use, steatorrhea and/or vitamin D deficiency

Magnesium Chloride 2cc-10cc (200mg/mL)

- Red and white blood cell levels may be decreased contributing to fatigue, muscle spasm, hyperirritability and blood sugar imbalances
- Deficiency is a common finding in inflammatory disorders of the bowel

Zinc Citrate 1cc-4cc (2.45mg/mL)

- May be deficient resulting in poor enterocyte and tissue healing

Reduced Glutathione	2cc-10cc (100mg/mL)

NOTES

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