Intravenous Nutrient Therapy: the "Myers' Cocktail"

Alan R. Gaby, MD

Abstract

Building on the work of the late John Myers, MD, the author has used an intravenous vitamin-and-mineral formula for the treatment of a wide range of clinical conditions. The modified "Myers' cocktail," which consists of magnesium, calcium, B vitamins, and vitamin C, has been found to be effective against acute asthma attacks, migraines, fatigue (including chronic fatigue syndrome), fibromyalgia, acute muscle spasm, upper respiratory tract infections, chronic sinusitis, seasonal allergic rhinitis, cardiovascular disease, and other disorders. This paper presents a rationale for the therapeutic use of intravenous nutrients, reviews the relevant published clinical research, describes the author's clinical experiences, and discusses potential side effects and precautions.

(*Altern Med Rev* 2002;7(5):389-403)

Introduction

John Myers, MD, a physician from Baltimore, Maryland, pioneered the use of intravenous (IV) vitamins and minerals as part of the overall treatment of various medical problems. The author never met Dr. Myers, despite living in Baltimore, but had heard of his work, and had occasionally used IV nutrients to treat fatigue or acute infections.

After Dr. Myers died in 1984, a number of his patients sought nutrient injections from the author. Some of them had been receiving injections monthly, weekly, or twice weekly for many years – 25 years or more in a few cases. Chronic problems such as fatigue, depression, chest pain, or palpitations were well controlled by these treatments; however, the problems would recur if the patients went too long without an injection.

It was not clear exactly what the "Myers' cocktail" consisted of, as the information provided by patients was incomplete and no published or written material on the treatment was available. It appeared that Myers used a 10-mL syringe and administered by slow IV push a combination of magnesium chloride, calcium gluconate, thiamine, vitamin B6, vitamin B12, calcium pantothenate, vitamin B complex, vitamin C, and dilute hydrochloric acid. The exact doses of individual components were unknown, but Myers apparently used a two-percent solution of magnesium chloride, rather than the more widely available preparations containing 20-percent magnesium chloride or 50-percent magnesium sulfate.

The author took over the care of Myers' patients, using a modified version of his IV regimen. Most notably, the magnesium dose was increased by approximately 10-fold by using 20-percent magnesium chloride, in order to approximate the doses reported to be safe and effective for the treatment of cardiovascular disease.[1,2] In addition, the hydrochloric acid was eliminated and the vitamin C was increased, particularly for problems related to allergy or infection. Folic acid was not included, as it tends to form a precipitate when mixed with other nutrients.

This treatment was suggested for other patients, and it soon became apparent that the modified Myers' cocktail (hereafter referred to as "the Myers'") was helpful for a wide range of clinical conditions, often producing dramatic results. Over an 11-year period, approximately 15,000

Alan R. Gaby, MD – Past president of the American Holistic Medical Association; author of *Preventing and Reversing Osteoporosis*, and co-author of *The Patient's Book of Natural Healing*.
Correspondence address: 301 Dorwood Drive, Carlisle, PA 17013.

injections were administered in an outpatient setting to an estimated 800-1,000 different patients. Conditions that frequently responded included asthma attacks, acute migraines, fatigue (including chronic fatigue syndrome), fibromyalgia, acute muscle spasm, upper respiratory tract infections, chronic sinusitis, and seasonal allergic rhinitis. A small number of patients with congestive heart failure, angina, chronic urticaria, hyperthyroidism, dysmenorrhea, or other conditions were also treated with the Myers' and most showed marked improvement. Many relatively healthy patients chose to receive periodic injections because it enhanced their overall well being for periods of a week to several months.

During the past 16 years these clinical results have been presented at more than 20 medical conferences to several thousand physicians. Today, many doctors (probably more than 1,000 in the United States) use the Myers'. Some have made further modifications according to their own preferences. In querying audiences from the lectern and from informal discussions with colleagues at conferences, the author has yet to encounter a practitioner whose experience with this treatment has differed significantly from his own.

Despite the many positive anecdotal reports, there is only a small amount of published research supporting the use of this treatment. There is one uncontrolled trial in which the Myers' was beneficial in the treatment of musculoskeletal pain syndromes, including fibromyalgia. Intravenous magnesium alone has been reported, mainly in open trials, to be effective against angina, acute migraines, cluster headaches, depression, and chronic pain. In recent years, double-blind trials have shown IV magnesium can rapidly abort acute asthma attacks. There are also several published case reports in which IV calcium provided rapid relief from asthma or anaphylactic reactions.

This paper presents a rationale for the use of IV nutrient therapy, reviews the relevant published clinical research, describes personal clinical experiences using the Myers', and discusses potential side effects and precautions.

Theoretical Basis for IV Nutrient Therapy

Intravenous administration of nutrients can achieve serum concentrations not obtainable with oral, or even intramuscular (IM), administration. For example, as the oral dose of vitamin C is increased progressively, the serum concentration of ascorbate tends to approach an upper limit, as a result of both saturation of gastrointestinal absorption and a sharp increase in renal clearance of the vitamin.[3] When the daily intake of vitamin C is increased 12-fold, from 200 mg/day to 2,500 mg/day, the plasma concentration increases by only 25 percent, from 1.2 to 1.5 mg/dL. The highest serum vitamin C level reported after oral administration of pharmacological doses of the vitamin is 9.3 mg/dL. In contrast, IV administration of 50 g/day of vitamin C resulted in a mean peak plasma level of 80 mg/dL.[4] Similarly, oral supplementation with magnesium results in little or no change in serum magnesium concentrations, whereas IV administration can double or triple the serum levels,[5,6] at least for a short period of time.

Various nutrients have been shown to exert pharmacological effects, which are in many cases dependent on the concentration of the nutrient. For example, an antiviral effect of vitamin C has been demonstrated at a concentration of 10-15 mg/dL,[4] a level achievable with IV but not oral therapy. At a concentration of 88 mg/dL *in vitro*, vitamin C destroyed 72 percent of the histamine present in the medium.[7] Lower concentrations were not tested, but it is possible the serum levels of vitamin C attainable by giving several grams in an IV push would produce an antihistamine effect *in vivo*. Such an effect would have implications for the treatment of various allergic conditions. Magnesium ions promote relaxation of both vascular[8] and bronchial[9] smooth muscle – effects that might be useful in the acute treatment of vasospastic angina and bronchial asthma, respectively. It is likely these and other nutrients exert additional, as yet unidentified, pharmacological effects when present in high concentrations.

In addition to having direct pharmacological effects, IV nutrient therapy may be more effective than oral or IM treatment for correcting intracellular nutrient deficits. Some nutrients are present at much higher concentrations in the cells than in the serum. For example, the average magnesium concentration in myocardial cells is 10 times higher than the extracellular concentration. This ratio is maintained in healthy cells by an active-transport system that continually pumps magnesium ions into cells against the concentration gradient. In certain disease states, the capacity of membrane pumps to maintain normal concentration gradients may be compromised. In one study, the mean myocardial magnesium concentration was 65-percent lower in patients with cardiomyopathy than in healthy controls,[10] implying a reduction in the intracellular-to-extracellular ratio to less than 4-to-1. As magnesium plays a key role in mitochondrial energy production, intracellular magnesium deficiency may exacerbate heart failure and lead to a vicious cycle of further intracellular magnesium loss and more severe heart failure.

Intravenous administration of magnesium, by producing a marked, though transient, increase in the serum concentration, provides a window of opportunity for ailing cells to take up magnesium against a smaller concentration gradient. Nutrients taken up by cells after an IV infusion may eventually leak out again, but perhaps some healing takes place before they do. If cells are repeatedly "flooded" with nutrients, the improvement may be cumulative. It has been the author's observation that some patients who receive a series of IV injections become progressively healthier. In these patients, the interval between treatments can be gradually increased, and eventually the injections are no longer necessary.

Other patients require regular injections for an indefinite period of time in order to control their medical problems. This dependence on IV injections could conceivably result from any of the following: (1) a genetically determined impairment in the capacity to maintain normal intracellular nutrient concentrations;[11] (2) an inborn error of metabolism that can be controlled only by maintaining a higher than normal concentration of a particular nutrient; or (3) a renal leak of a nutrient.[12] In some cases, continued IV therapy may be necessary because a disease state is too advanced to be reversible.

The Modified Myers' Cocktail

See Table 1 for the nutrients that make up the modified Myers' cocktail.

Dexpanthenol is the commercially available injectable form of pantothenic acid (vitamin B5). One milliliter of B complex 100 contains 100 mg each of thiamine and niacinamide, and 2 mg each of riboflavin, dexpanthenol, and pyridoxine.

Table 1. *Nutrients in Myers' Cocktail*

Magnesium chloride hexahydrate 20% (magnesium)	2-5 mL
Calcium gluconate 10% (calcium)	1-3 mL
Hydroxocobalamin 1,000 mcg/mL (B12)	1 mL
Pyridoxine hydrochloride 100 mg/mL (B6)	1 mL
Dexpanthenol 250 mg/mL (B5)	1 mL
B complex 100 (B complex)	1 mL
Vitamin C 222 mg/mL (C)	4-20 mL

All ingredients are drawn into one syringe, and 8-20 mL of sterile water (occasionally more) is added to reduce the hypertonicity of the solution. After gently mixing by turning the syringe a few times, the solution is administered slowly, usually over a period of 5-15 minutes (depending on the doses of minerals used and on individual tolerance), through a 25G butterfly needle. Occasionally, smaller or larger doses than those listed in Table 1 have been used. Low doses are often given to elderly or frail patients, and to those with hypotension. Doses for children are lower than those listed, and are reduced roughly in proportion to body weight. The most commonly used regimen has been 4 mL magnesium, 2 mL calcium, 1 mL each of B12, B6, B5, and B complex, 6 mL vitamin C, and 8 mL sterile water.

The following is a review of conditions successfully treated with the Myers'. The numbers of patients treated and proportion that responded are, for the most part, estimates.

Asthma

Case #1: A five-year-old boy presented with a two-year history of asthma. During the previous 12 months he had suffered 20 asthma attacks severe enough to require a visit to the hospital emergency department. His symptoms appeared to be exacerbated by several foods, and skin tests had been positive for 23 of 26 inhalants tested. His initial treatment consisted of identification and avoidance of allergenic foods, as well as daily oral supplementation with pyridoxine (50 mg), vitamin C (1,000 mg), calcium (200 mg), magnesium (100 mg), and pantothenic acid (100 mg), in two divided doses with meals. On this regimen, he experienced marked improvement, and had no asthma attacks requiring medical care until nearly 11 months after his initial visit.

At that time the child, now six years old, presented for an emergency visit with mild but persistent wheezing and difficulty breathing. He was given a slow IV infusion containing 6 mL vitamin C, 1.4 mL magnesium, and 0.5 mL each of calcium, B12, B6, B5, and B complex. The symptoms resolved within two minutes and did not recur.

Over the ensuing eight years and three months, he received a total of 63 IV treatments for acute exacerbations of asthma. In most instances, a single injection resulted in marked improvement or complete relief within two minutes, and the acute symptoms did not recur. Occasionally, a second injection was needed after a period of 12 hours to two days, and during one episode three treatments were required over a four-day period. As the patient grew, the nutrient doses were gradually increased; by age 10 he was receiving 10 mL vitamin C, 3 mL magnesium, 1.5 mL calcium, and 1 mL each of B12, B6, B5, and B complex.

The treatment was unsuccessful only once; on that occasion the patient presented with generalized urticaria, angioedema, and unusually severe asthma, after the inadvertent ingestion of an artificial food coloring (FD&C red #40) and other potential allergens. Three separate injections given over a 60-minute period produced transient improvement each time. However, the symptoms returned, and he was taken to the emergency room and hospitalized.

Despite that single treatment failure, the patient and his parents reported that IV nutrient therapy worked faster, produced a more sustained improvement, and caused considerably fewer side effects than the conventional therapies he had received previously in the emergency room.

The author has treated approximately a dozen asthmatics (mainly adults) with the Myers' for acute asthma attacks; in most instances, marked improvement or complete relief occurred within minutes. A few patients received maintenance injections once weekly or every other week during difficult times and reported the treatments kept their asthma under better control.

Intravenous magnesium is now well documented as an effective treatment for acute asthma. In one study, 38 patients with an acute exacerbation of moderate-to-severe asthma that had failed to respond to conventional beta-agonist therapy were randomly assigned to receive, in double-blind fashion, IV infusions of either magnesium sulfate (1.2 g over a 20-minute period) or placebo (saline).[13] Peak expiratory flow rate improved to a

significantly greater extent in the magnesium group (225 to 297 L/min) than the placebo group (208 to 216 L/min). In addition, the hospitalization rate was significantly lower in the magnesium group than in the placebo group (37% vs. 79%; $p < 0.01$). No patient had a significant drop in blood pressure or change in heart rate after receiving magnesium.

In a second double-blind study, 149 patients with acute asthma who were being treated with inhaled beta-agonists and IV steroids were randomly assigned to receive an IV infusion of magnesium sulfate (2 g over 20 minutes) or saline placebo, beginning 30 minutes after presentation.[14] Among patients with severe asthma (defined as forced expiratory volume in 1 second [FEV_1] less than 25 percent of predicted value) compared with placebo, magnesium significantly reduced the hospitalization rate (33.3% vs. 78.6%; $p < 0.01$) and significantly improved FEV_1. However, magnesium treatment was of no benefit to patients with moderate asthma (defined as baseline FEV_1 between 25 and 75 percent of predicted value).

In two placebo-controlled studies of asthmatic children, IV magnesium sulfate significantly improved pulmonary function and significantly reduced hospitalization rates during acute exacerbations that had failed to respond to conventional therapy.[15,16] A dose of 40 mg per kg body weight (maximum dose, 2 g) given over a 20-minute period appeared to be more effective than 25 mg per kg. Higher doses of IV magnesium sulfate (10-20 g over 1 hour, followed by 0.4 g per hour for 24 hours) have been used successfully in the treatment of life-threatening status asthmaticus.[6] In a few studies, IV magnesium failed to improve pulmonary function or to reduce the need for hospitalization.[17,18] However, a meta-analysis of seven randomized trials concluded that IV magnesium reduced the need for hospitalization by 90 percent among patients with severe asthma, although the treatment was not beneficial for patients with moderate asthma.[19]

Calcium is the only other component of the Myers' that has been studied as a treatment for acute exacerbations of asthma. In an early report, a series of IV infusions of calcium chloride relieved asthma symptoms in three consecutive patients, with relief occurring almost immediately after some injections.[20] Intravenous and IM administration of an unspecified calcium salt temporarily inhibited severe anaphylactic reactions in two other patients.[21]

Nutrients other than magnesium and calcium may have contributed to the beneficial effect observed in asthma patients. Oral vitamins C[22] and B6[23,24] and IM vitamin B12[25] have each been used with some success against asthma, although none of these nutrients has been tested as a treatment for acute attacks. Intramuscular administration of niacinamide has been shown to reduce the severity of experimentally induced asthma in guinea pigs,[26] and pantothenic acid appears to have an anti-allergy effect in humans.[27]

On one occasion, a patient's asthma attack was treated with IV magnesium alone. Although the symptoms resolved rapidly, they returned within 10-15 minutes. The remaining constituents of the Myers' (without additional magnesium) were then administered, and the symptoms disappeared almost immediately and did not return. Thus, it seems the Myers' is more effective than magnesium alone in the treatment of asthma attacks.

Migraine

Case #2: A 44-year-old female suffered from frequent migraines, which appeared to be triggered in many instances by exposure to environmental chemicals or, occasionally, to ingestion of foods to which she was allergic. Allergy desensitization therapy had provided little benefit. Over a six-year period, the patient was given IV therapy on approximately 70 occasions for migraines. Nearly all of these injections resulted in considerable improvement or complete relief within several minutes, although a few treatments were ineffective. Through trial and error, it was determined her most effective regimen

was 16 mL vitamin C, 5 mL magnesium, 4 mL calcium, 2 mL B6, and 1 mL each of B12, B5, and B complex. The 4-mL dose of calcium was found to provide better relief than lower calcium doses.

Over the years, a half dozen other patients have presented one or more times with an acute migraine. In almost every instance, the Myers' produced a gratifying response within a few minutes.

The beneficial effect of IV magnesium as a treatment for migraine has been demonstrated in recent clinical trials. In one study, 40 patients with an acute migraine received 1 g magnesium sulfate over a five-minute period.[28] Fifteen minutes after the infusion, 35 patients (87.5%) reported at least a 50-percent reduction of pain, and nine patients (22.5%) experienced complete relief. In 21 of 35 patients who benefited, the improvement persisted for 24 hours or more. Patients with an initially low serum ionized magnesium concentration (less than 0.54 mMol/L) were significantly more likely to experience long-lasting improvement than were patients with initially higher serum ionized magnesium levels. In a single-blind trial that included 30 patients with an acute migraine, IV administration of magnesium sulfate (1 g over 15 minutes) completely and permanently relieved pain in 13 of 15 patients (86.6%), whereas no patients in the placebo group became pain free ($p < 0.001$ for difference between groups).[29] In addition, magnesium treatment resulted in rapid disappearance of nausea, vomiting, and photophobia in all 14 patients who had experienced those symptoms.

A single 1-g dose of magnesium sulfate has also been reported to abort an episode of cluster headaches in seven of 22 patients (32%), and a series of three to five injections provided sustained relief in an additional two patients (9%).[30]

It is not clear whether the Myers' is more effective than magnesium alone for migraines; however, one patient did experience noticeable benefit from IV calcium.

Fatigue

Many patients with unexplained fatigue have responded to the Myers', with results lasting only a few days or as long as several months. Patients who benefited often returned at their own discretion for another treatment when the effect had worn off. One patient with fatigue associated with chronic hepatitis B experienced marked and progressive improvement in energy levels with weekly or twice-monthly injections.

Approximately 10 patients with chronic fatigue syndrome (CFS) received a minimum of four treatments (usually once weekly for four weeks), with more than half showing clear improvement. One patient experienced dramatic benefit after the first injection, whereas in other cases three or four injections were given before improvement was evident. A few patients became progressively healthier with continued injections and were eventually able to stop treatment. Several others did not overcome their illness, but periodic injections helped them function better.

There is some research support for the use of parenteral magnesium in patients with fatigue. One study found magnesium deficiency, demonstrated by an IV magnesium-load test, in 47 percent of 93 patients with unexplained chronic fatigue, including 50 with CFS.[31] In a second study, the mean erythrocyte magnesium concentration was significantly lower in 20 patients with CFS than in healthy controls.[32]

As one arm of the second study, 32 patients with CFS were randomly assigned to receive, in double-blind fashion, 1 g magnesium sulfate IM or placebo, once weekly for six weeks. Twelve (80%) of 15 patients given magnesium reported improvement (e.g., more energy, a better emotional state, and less pain) and fatigue was eliminated completely in seven cases. In contrast, only three (18%) of 17 placebo-treated patients improved ($p = 0.0015$ for difference between groups), and in no case was the fatigue completely eliminated. According to one report, at least half of CFS patients with magnesium deficiency benefited from oral magnesium supplementation; however, some patients needed IM injections.[33]

Other investigators, using the IV magnesium-load test, found no evidence of magnesium deficiency in patients with CFS, and observed no improvement in symptoms following a single infusion of magnesium sulfate (6 g in one hour).[34]

Vitamin B12, given IM, has been reported to be helpful for patients with unexplained fatigue,[35] as well as those with CFS.[36] While the results obtained with the Myers' may be attributable in part to vitamin B12, many patients who responded to IV therapy obtained little or no benefit from IM vitamin B12 alone.

Fibromyalgia

Case #3: A 48-year-old woman presented with a six-year history of fairly constant myalgias and arthralgias, with pain in the neck, back, and hip, and tightness in the left arm. Six months previously she was found to have an elevated sedimentation rate (50 mm/hr). She was diagnosed by a rheumatologist as possibly having polymyalgia rheumatica, although the diagnosis of fibromyalgia was also considered. Her history was also significant for migraines about eight times per year and chronic nasal congestion. Physical examination revealed extremely stiff muscles, with decreased range of motion in many areas of her body.

The patient was given a therapeutic trial consisting of 6 mL vitamin C, 4 mL magnesium, 2.5 mL calcium, and 1 mL each of B12, B6, B5, and B complex. At the end of the injection, she got off the table and, with a look of amazement, announced her muscle aches and joint pains were gone for the first time in six years. This treatment was repeated after a week (at which time her symptoms had not returned), followed by every other week for several months, then once monthly for three years. Her initial regimen also included the identification and avoidance of allergenic foods and treatment with low-dose desiccated thyroid (eventually stabilized at 60 mg per day). She discovered that eating refined sugar caused myalgias and arthralgias, and that thyroid hormone improved her energy level, mood, and overall well being. During the three years of monthly maintenance injections she reported symptoms would begin to recur if she went much longer than a month between treatments. However, they were never as severe as they were before she began receiving IV therapy.

The author has given the Myers' to approximately 30 patients with fibromyalgia; half have experienced significant improvement, in a few cases after the first injection, but more often after three or four treatments.

The beneficial effect of parenteral nutrient therapy has been confirmed by one study published only as an abstract. Eighty-six patients with chronic muscular complaints, including myofascial pain, relapsing soft tissue injuries, and fibromyalgia, received IM or IV injections of magnesium, either alone or in combination with calcium, B vitamins, and vitamin C.[37] Improvement occurred in 74 percent of the patients; of those, 64 percent required four or fewer injections for optimal results. A minority of patients required long-term oral or parenteral magnesium to maintain improvement. The positive response to parenteral magnesium is consistent with the observation that nearly half of patients with fibromyalgia have intracellular magnesium deficiency, despite having normal serum levels of the mineral.[38]

Depression

Case #4: A 46-year-old man presented with a history of depression and anxiety since childhood. He had been in psychoanalysis for the past eight years. A therapeutic trial with IV nutrients was considered because the patient reported that consumption of alcohol (known to deplete magnesium) aggravated his symptoms, and because he was taking a magnesium-depleting thiazide diuretic for hypertension. He was initially given 1 mL each of magnesium, B12, B6, B5, and B complex, which resulted in a 70-80 percent reduction in his symptoms for one week. A second injection produced a similar response that lasted two weeks. Through trial and error it was determined the most effective treatment was 5 mL magnesium, 3 mL B complex, and 1 mL each of B12, B6, and B5. The addition of calcium to the injection appeared to block some of the benefit.

Both oral and IM administration of the same nutrients were tried but found to be ineffective. Weekly injections provided almost complete relief from symptoms and allowed him to discontinue psychotherapy. The patient noted that rapidly administered injections provided longer-lasting relief than did slower injections. The infusion rate was therefore carefully and progressively increased, without causing any adverse side effects or changes in blood pressure or heart rate. The patient reported that when the treatment was given over a one-minute period, the effect would last approximately two weeks, whereas a slower injection (such as five minutes) would last only a week. Approximately four years after initial treatment, he was able to reduce the frequency of injections to once monthly or less.

Many other patients with depression and/or anxiety have shown a positive response to the Myers'. However, this treatment should not be considered first-line therapy for major depression. It seems to be helpful only for certain subsets of depressed individuals, such as those who also suffer from fibromyalgia, migraines, excessive stress, or alcohol-induced exacerbations. Shealy et al have observed an antidepressant effect of IV magnesium in some patients with chronic pain.[39]

Cardiovascular Disease

Case #5: A 79-year-old man was seen at home in end-stage heart failure, after having suffered four myocardial infarctions. During the previous 12 months, spent mostly in the hospital, he had become progressively worse; his ejection fraction had fallen to 19 percent and his body weight had declined from 171 pounds to a severely cachectic 113 pounds. He was confined to bed and required supplemental oxygen much of the time. He also had severe peripheral occlusive arterial disease, which had resulted in the development of gangrene of six toes. A peripheral angiogram revealed complete occlusion of both femoral-popliteal arteries, with no detectable blood flow to the distal extremities. Two independent vascular surgeons had recommended bilateral above-the-knee amputations to prevent development of septicemia. However, the cardiologist advised the patient that his heart would not last more than another month, so the patient declined the amputations.

He was treated with weekly IM injections of magnesium sulfate (1 g) for eight weeks, and prescribed oral supplementation with vitamins C and E, B complex, folic acid, and zinc. The magnesium injections appeared to reduce the pain in his gangrenous toes considerably, with the benefit lasting about five days each time. Six weeks after the first injection, his ejection fraction had increased from 19 percent to 36 percent and he no longer required supplemental oxygen. After eight weeks, the IM injections were replaced by weekly IV injections, consisting of 5 mL magnesium, 1 mL each of B12, B6, B5, and B complex, and a low-dose (0.2 mL) trace mineral preparation (MTE-5 containing: zinc, copper, chromium, selenium, and manganese). After a total of 18 months, his weight had increased from 113 to 147 pounds, which was remarkable as cardiac cachexia is generally considered to be irreversible. In addition, the gangrenous areas on his toes had sloughed and been replaced almost entirely by healthy tissue. Intravenous therapy was continued and eventually reduced to every other week. The patient lived for eight years and died at age 87 from multiple organ failure.

Of the handful of other patients with angina or heart failure who received IV or IM injections of magnesium (with or without B vitamins), all showed significant improvement. The results with angina are consistent with those reported by others using parenteral magnesium therapy.[40-42]

Upper Respiratory Tract Infections

Case #6: A 40-year-old male presented with a cold and a one-day history of fatigue, nasal congestion, and rhinorrhea. He was given an IV infusion of 16 mL vitamin C, 3 mL magnesium, 1.5 mL calcium, and 1 mL each of B12, B6, B5, and B complex. By the end of the 10-minute treatment he was symptom free. The cold symptoms did return the next day but were only 10 percent as severe as before the injection.

One-quarter to one-third of patients who received the Myers' for an acute respiratory infection experienced marked improvement, either immediately or by the next morning. Approximately half of patients given this treatment reported that it shortened the duration of their illness. Patients who benefited tended to have a similar response if treated for a subsequent infection, whereas non-responders tended to remain non-responders.

Case #7: A 32-year-old female had a long history of chronic sinusitis. Avoidance of allergenic foods and oral supplementation with vitamin C and other nutrients had provided only minimal benefit. She was given an IV infusion of 20 mL vitamin C, 4 mL magnesium, 2 mL calcium, and 1 mL each of B12, B6, B5, and B complex; this protocol was repeated the next day. At the time these injections were given she had been experiencing persistent sinus problems for a year. Her symptoms resolved rapidly after the injections and she remained relatively symptom free for more than six months. The same treatment given at a later date was also helpful, although the benefit was not as pronounced as the first time.

One other patient with chronic sinusitis had a similar response to back-to-back injections, while a few others showed no improvement.

Seasonal Allergic Rhinitis

Case #8: A 38-year-old man had a long history of seasonal allergic rhinitis, occurring each spring and lasting about a month. Symptoms included nasal congestion, itchy eyes, and fatigue. During a symptomatic period, an IV infusion of 12 mL vitamin C, 3 mL magnesium, and 1 mL each of B12, B6, B5, and B complex provided rapid relief. This treatment was repeated as needed during the hay fever season (once weekly or less) and successfully controlled his symptoms. In subsequent years he began the IVs shortly before, and repeated them periodically during, the hay fever season; this approach prevented the development of symptoms.

Narcotic Withdrawal

Case #9: A 35-year-old man addicted to morphine came to the office in the early stages of withdrawal, with diaphoresis and extreme agitation. He was given an IV infusion of 16 mL vitamin C, 5 mL magnesium, 2.5 mL calcium, and 1 mL each of B12, B6, B5, and B complex. In his agitated state he was unable to sit still on the exam table, so we walked up and down the hall with a butterfly needle in his arm. Halfway through the injection, he was able to sit still, and by the end of the injection his withdrawal symptoms were alleviated. The symptoms returned 36 hours later; he therefore came for another treatment, which again relieved the symptoms within minutes. He returned the next day, still symptom free, for a third injection, which carried him uneventfully through the remainder of the withdrawal period.

Chronic Urticaria

Case #10: A 71-year-old woman had chronic urticaria with hives present somewhere on her body nearly every day for 10 years. An allergy-elimination diet and oral supplementation with vitamin C and other nutrients provided little or no relief. She was given an IV infusion of 12 mL vitamin C, 3 mL magnesium, 1.5 mL calcium, and 1 mL each of B12, B6, B5, and B complex. The same treatment was repeated the following day. After these injections the hives resolved rapidly and did not recur for more than a year. When the lesions did recur, the IV treatment was repeated but was ineffective.

Athletic Performance

Case #11: An 18-year-old, 235-pound high school wrestler developed a flu-like illness four days before a major tournament. Two days before the three-day tournament, when it appeared he might have to miss the event, he was given an IV injection of 16 mL vitamin C, 5 mL magnesium, 2.5 mL calcium, and 1 mL each of B12, B6, B5, and B complex. The next morning he remarked that he had more energy than he had ever had in

his life. This energy boost persisted for the duration of the tournament, at which he took second place, a better performance than at any other time in his career.

In this era in which many athletes are using performance-enhancing drugs, it is not the author's intention to encourage athletes to seek another "boost" with IV nutrients. However, this case does demonstrate that nutritional factors can play an important role in athletic performance.

Hyperthyroidism

Two patients with hyperthyroidism were treated with the Myers' once or twice weekly for several weeks. In one case, the treatment controlled the symptoms of hyperthyroidism, although there was no reduction in thyroid-hormone levels. The injections were discontinued after medical therapy had restored the hormone levels to normal. In the other case, symptoms improved markedly after the first injection and thyroid-function tests, measured two weeks later, returned to normal.

The potential value of IV nutrient therapy for patients with hyperthyroidism is supported by several studies. Serum and erythrocyte magnesium levels have been found to be low in patients with Graves' disease.[43] In addition, daily IM injections of magnesium chloride (20 mL of a 14-percent solution) for 3-7 weeks reduced the size of the thyroid gland and improved the clinical condition of three patients with hyperthyroidism.[44] Intravenous vitamin B6 (50 mg per day) was reported to relieve muscle weakness in three patients with hyperthyroidism,[45] and animal studies indicate vitamin B12 can counteract some of the adverse effects of experimentally induced hyperthyroidism.[46,47]

Other Conditions

The modified Myers' cocktail seems to provide rapid relief for patients with acute muscle spasm resulting from sleeping in the wrong position or from overuse. It also has been observed to relieve tension headaches in many cases. One patient (a 70-year-old female) with chronic torticollis experienced moderate pain relief with periodic treatments. Of three patients with acute dysmenorrhea treated with the Myers', two experienced almost instant pain relief. One patient with chronic obstructive pulmonary disease intermittently received weekly IV injections and reported the treatments improved his strength and breathing.

Choice of Ingredients and Administration

At the time of this writing, cyanocobalamin is a widely available form of injectable vitamin B12, whereas hydroxocobalamin can be obtained only through a compounding pharmacist. While both forms of the vitamin are effective, hydroxocobalamin is preferred because it produces more prolonged increases in serum vitamin B12 levels.[48]

It has been the author's impression (and that of other clinicians) that some patients who respond to IM vitamin B12 injections do not experience the same benefit when vitamin B12 is given as part of the Myers'. It is possible that vitamin C or another component of the Myers' destroys some of the vitamin B12,[49] or that IV vitamin B12 is lost more rapidly in the urine than IM vitamin B12. Therefore, for some patients receiving IV nutrient therapy, the vitamin B12 is given IM in a separate syringe.

Injectable magnesium can be obtained either as magnesium chloride hexahydrate (20% solution), commonly called magnesium chloride, or magnesium sulfate heptahydrate (50% solution), commonly called magnesium sulfate. Although most clinical research has been done with magnesium sulfate, some experts prefer magnesium chloride for IV use because of its greater retention in the body.[50] The author has used magnesium chloride almost exclusively for IV therapy, while reserving the more concentrated magnesium sulfate for IM administration. For those using magnesium sulfate, it should be noted that 1 g (2 mL of a 50-percent solution) is equivalent to 0.8 g (4 mL of a 20-percent solution) of magnesium chloride (each contains 4 mMol of magnesium). In addition, if 50-percent magnesium sulfate is given IV instead of 20-percent magnesium chloride, it should be diluted appropriately with sterile water.

Injectable vitamin C is currently available in concentrations of 222 and 500 mg per mL. The author typically uses the lower concentration for IV therapy. If the higher concentration is used, it should be diluted appropriately with sterile water.

Occasionally, trace minerals were included as part of a nutrient infusion. The usual dose was 0.2-0.5 mL of MTE-5, which contains (per mL): zinc 1 mg, copper 0.4 mg, chromium 4 mcg, selenium 20 mcg, and manganese 0.1 mg. The preparation was diluted six-fold and administered over a period of 1-2 minutes in a separate syringe at the end of the Myers' push. Two adverse reactions have been noted with 10 mg of zinc given by slow IV push; consequently, when giving trace minerals by IV push, very small doses are used. Trace minerals should not be mixed in the same syringe with the components of the Myers', as doing so often causes formation of a precipitate.

Side Effects and Precautions

The Myers' often produces a sensation of heat, particularly with large doses or rapid administration. This effect appears to be due primarily to the magnesium, although rapid injections of calcium have been reported to produce a similar effect.[22] The sensation typically begins in the chest and migrates to the vaginal area in women and to the rectal area in men. For most patients the heat does not cause excessive discomfort; indeed, some patients enjoy it. However, if the infusion is given too rapidly, the warmth can be overbearing. Some women experience a sensation of sexual pleasure in association with the vaginal warmth; on rare occasions, an orgasm may occur during an IV infusion. Other patients have remarked their visual acuity and color perception become sharper immediately after an injection, as if someone had turned the lights on. In some cases, this effect lasts as long as one or two days.

Too rapid administration of magnesium can cause hypotension, which can lead to lightheadedness or even syncope. Patients receiving a Myers' should be advised to report the onset of excessive heat (which can be a harbinger of hypotension) or lightheadedness. If either of these symptoms occurs, the infusion should be stopped temporarily and not resumed until the symptoms have resolved (usually after 10-30 seconds). Patients with low blood pressure tend to tolerate less magnesium than do patients with normal blood pressure or hypertension. In a small proportion of patients, even a low-dose regimen given very slowly causes persistent hypotension; in those cases, the treatment is usually discontinued and may or may not be attempted at a later date.

Although too rapid administration can have adverse consequences, some patients appear to experience more pronounced benefits from rapid infusions than from slower ones, presumably because of higher peak serum concentrations of nutrients. While both the risks and benefits should be taken into account in determining an infusion rate, when in doubt one should err on the side of safety. When administering the Myers' to a patient for the first time, it is best to give 0.5-1.0 mL and then wait 30 seconds or so before proceeding with the rest of the infusion. Doing so may help one distinguish between a vasovagal reaction and a hypotensive response to the injected compounds. Patients who experience a vasovagal reaction at the beginning of an infusion can usually tolerate the remainder of the treatment after the reaction has worn off.

For elderly or frail individuals, it may be advisable to start with lower doses than those listed in Table 1, or to consider IM administration of magnesium and B vitamins as an alternative to IV therapy. However, many elderly patients have tolerated, and benefited from, IV therapy.

Patients who are deficient in both magnesium and potassium may have an influx of potassium into the cells after receiving IV magnesium.[51] This occurs because magnesium activates the membrane pump that promotes the intracellular uptake of potassium. The shift of potassium from the serum to the intracellular space can trigger hypokalemia. The author has seen two patients develop severe muscle cramps several hours after receiving a Myers'; both patients had been taking medications known to deplete potassium. Hypokalemia also increases the risk of digoxin-induced cardiac arrhythmias. As a first-year resident,

unaware of this potential problem, the author administered IV magnesium in the hospital to an elderly woman who was taking digoxin and a potassium-depleting diuretic. She quickly developed an arrhythmia, which required short-term treatment in the intensive care unit.

Patients considered to be at risk of potassium deficiency include those taking potassium-depleting diuretics, beta-agonists, or glucocorticoids; those with diarrhea or vomiting; and those who are generally malnourished. If a patient is hypokalemic, the hypokalemia should be corrected before IV magnesium therapy is considered. However, a normal serum potassium concentration is not a guarantee against intracellular potassium depletion. For patients considered to be at risk of potassium deficiency, administration of 10-20 mEq of potassium orally just prior to the infusion, and again 4-6 hours later is recommended. After this practice was instituted, no further problems with magnesium-induced muscle cramps were encountered.

The addition of even small amounts of potassium to an IV push is strongly discouraged, because of the theoretical risk of triggering an arrhythmia during the first pass when the bolus reaches the cardiac conducting system.

Intravenous calcium is contraindicated in patients taking digoxin. In addition, hypercalcemia can cause cardiac arrhythmias. For that reason, the author has tended to leave calcium out of the Myers' when treating patients with cardiac disease, although there is no strong evidence it is dangerous for such patients.

Anaphylactic reactions to IV thiamine have been reported on rare occasions. Only three such reactions have been identified in the U.S. literature since 1946. However, in the world literature, a total of nine deaths attributed to thiamine administration were reported between 1965 and 1985.[52] These reactions have occurred after oral, IV, IM, or subcutaneous administration, and are believed to be due in part to a nonspecific release of histamine. Anaphylactic reactions have been seen most often after multiple administrations of thiamine. In the United Kingdom, between 1970 and 1988, there were approximately four reports of anaphylactoid reactions for every million ampules of IV B vitamins sold, and one report for every 5 million IM ampules sold.[53]

It is possible the risk of anaphylaxis from the Myers' is even lower than the low risk associated with the use of IV thiamine. Many patients who receive parenteral thiamine are alcoholics, and alcoholism frequently causes magnesium deficiency. Animal studies suggest thiamine supplementation in the presence of magnesium deficiency increases the severity of the magnesium deficiency.[54] A deficiency of magnesium can lead to spontaneous release of histamine,[55] and has been reported to increase the incidence of experimentally induced anaphylaxis in animals.[56] The presence of magnesium in the Myers' might, therefore, reduce the risk of an anaphylactic reaction to thiamine. Moreover, as the Myers' has been used successfully to treat asthma and urticaria, it is likely the formula as a whole provides prophylaxis against anaphylaxis. Nevertheless, practitioners who administer IV nutrients should be prepared to deal with the rare anaphylactic reaction.

A small number of patients (approximately one percent) felt "out of sorts" for up to a day after receiving an injection and, in two cases, this reaction lasted one and two weeks, respectively. It is not clear whether these reactions were due to the preservatives in some of the injectable preparations (e.g., benzyl alcohol, methylparabens, or others) or to the nutrients themselves. In most cases (including a few patients with asthma) preservative-containing products were used because the use of multi-dose vials reduced the cost of treatment to the patient. However, for some individuals with known chemical sensitivities or other significant allergy-related problems, preservative-free preparations were used.

Although the Myers' is extremely hypertonic, it rarely seemed to cause problems related to its hypertonicity. Two or three patients developed phlebitis at the injection site; for those patients, later treatments were diluted with sterile water to a total of 60 mL. Some patients experienced a burning sensation at the injection site during the infusion; this was often corrected by re-positioning the needle or by further diluting the nutrients.

When administered with caution and respect, the Myers' has been generally well tolerated, and no serious adverse reactions have been encountered with approximately 15,000 treatments.

Cost Considerations

In 1995, the author's last year in private practice, the cost of the materials for a Myers' was approximately $5.00. The use of preservative-free nutrients at least doubled the cost of materials. Nursing time and administrative factors represented the majority of the cost of IV nutrient therapy. In 1995, the author's fee for a Myers' was $38.00. Other doctors have charged as little as $15.00 or as much as $100.00 or more. Since 1995, the cost of most of the injectable preparations has increased by 50-100 percent.

Insurance companies do not generally pay for this treatment. However, in a few instances, showing them that IV nutrient therapy had greatly reduced the overall cost of the patient's health care persuaded them to pay.

Conclusion

The Myers' has been found by the author and hundreds of other practitioners to be a safe and effective treatment for a wide range of clinical conditions. In many instances this treatment is more effective and better tolerated than conventional medical therapies. Although most of the evidence is anecdotal, some published research has demonstrated the efficacy of the Myers' or some of its components. Widespread appropriate use of this treatment would likely reduce the overall cost of healthcare, while greatly improving the health of many individuals. Additional research is urgently needed to confirm the effectiveness of this treatment and to determine optimal doses of the various nutrients. Although double-blind trials would be difficult to perform because of the obvious sensations induced by IV nutrient infusions, trials comparing the Myers' with established therapies would be informative. Practitioners using this treatment are encouraged to report their findings.

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