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Consumer IV Vitamin Therapy: Wellness Boost or Toxicity Threat?
 --Manuscript Draft--

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Article Type:	Column (Clinical Nutrition)
Keywords:	IV vitamin therapy; "drip bars"; hydration rooms; medical spas; hydration; hangover cure; intravenous therapy; wellness
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Consumer IV Vitamin Therapy: Wellness Boost or Toxicity Threat?

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Abstract

Intravenous vitamin therapy (IVVT) has become increasingly popular in recent years promising to cure or improve a variety of health problems or infuse “wellness”. Patients and consumers have IV vitamins or other nutrients and fluids infused into their arms outside the hospital setting in medical spas, hydration rooms, integrative medicine, and concierge primary care practices. The IVVT “menu” options include but are not limited to mixes containing Vitamin C, B12, glutathione, electrolytes, and saline. In the U.S., the IV administration of nutrients is considered drug or parenteral nutrition. In this paper, we describe what we learned while trying to answer a question of a patient contemplating an IVVT treatment at a retail store. Discussion of the regulatory issues and pharmacokinetics associated with IVVT is complex and beyond the scope of this paper. There is insufficient evidence to conclude there is benefit from these expensive services provided often without the knowledge of the person’s primary care physician but believe there is possibility of harm.

Introduction

We were surprised by a question asked by one of our patients. “I read an article on ways to maintain positive, mind, body and soul during COVID. “The advice was if we have bad eating habits and don’t drink enough water, add an alternative health treatment for the body to our routine—IV vitamin hydration. It’s expensive, what do you think?” With the advent of social media to help promote easier and faster communication, new health trends can go viral quickly and “IV Vitamin Therapy” (IVVT) is a recent example of one. Traditionally, intravenous therapy (IV) is used in conventional medical settings for the for management of fluids and electrolytes for patients who cannot swallow, are dehydrated, or have other conditions that require timely

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5 correction of fluid or electrolyte imbalance. There are guidelines for its use, based on evidence-
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7 based research, for these types of conditions (1-4).
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10 Now unconventional uses are emerging. Consumers with hopes of having healthier skin, killing
11
12 a cold, strengthening their immune system, curing a hangover, or obtaining feelings of wellness
13
14 can now have IVVT performed in both integrative medicine and concierge primary care clinics
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16 as well as in retail locations referred to as drip bars, vitamin infusion or hydration rooms and
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18 medical spas. Consumers may schedule an appointment in the retail locations and receive
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20 IVVT without seeing their primary care physician. We did not find evidence-based guidelines for
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22 uses such as these for IVVT outside conventional medical settings.
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26 **Our Search for Information**

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28 **Literature Search.**

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31 Our literature search yielded almost nothing in terms of primary research about the risks and
32
33 benefits of providing IVVT outside the hospital setting. Multiple “and” and “or” searches of the
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35 medical literature were conducted using a variety of keywords, including “vitamin,” “infusion,”
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37 “therapy,” “IV,” “intravenous,” “hangover,” “Myers,” “cocktail,” and “safe,” “risks,” “and
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39 “alternative.” The search of for evidence for IVVT yielded 155 papers consisting mostly of case
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41 or self-reports and uses as adjunctive treatment for cancer, poisonings, dementia, acute kidney
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43 disease, trauma, oligohydramnios, and end of life care. Most studies had small sample sizes
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45 and non-statistically significant findings. The search specific to hangovers yielded 26 papers,
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47 with limited relevance to our topic. We reviewed one paper describing the Myer’s Cocktail which
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49 is promoted in both clinical and retail outlets. “Myer’s Cocktail” consists of a mixture of
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51 substances, including magnesium, calcium, B complex vitamins, and Vitamin C (5-6). See
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53 Figure 1 for details. That formulation has been reported to be mixed into a syringe with 20 mL of
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55 water and administered over 5-15 minutes, but this varies among spas and clinics (5). We also
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4 reviewed a paper characterizing IVVT as practiced in Czechoslovakia, Ireland, Italy, Poland,
5 and the United Kingdom (7). Kaminski and coworkers were unable to find information about the
6 quality or reliability of the services but noted IVVT was offered for many conditions including
7 fatigue, immunity enhancement, anti-aging, increased physical prowess, management of certain
8 malignancies and fertility problems (7). We didn't find comparable papers describing the
9 practices in the United States or Canada.
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21 **GOOGLE Search.**

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24 A GOOGLE search did not reveal evidence-based studies but did identify many blogs,
25 editorials, personal websites, and names of clinics, and businesses that offered "Myers Cocktail"
26 as well as individualized formulas. Some of these sites like Healthline (8) cautioned readers
27 about using such remedies. The websites from some alternative and integrative medicine
28 clinics include descriptions of their patients' experiences. At least one integrative medicine
29 clinic (<https://www.gwcim.com/services/myers-cocktail>), included a reference to the paper
30 describing the "Myers Cocktail" and another on fibromyalgia (5, 9).
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41 There were websites that encouraged entrepreneurs to start their own business by franchising
42 from the parent company "to cash in on this growing niche" (10). There were also dozens of
43 websites dedicated to "Hangover" cures and kits.
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51 **Search for Local Providers of IVVT.**

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53
54 Spurred on by our patient's question, we identified medical spas and primary care offices
55 offering these services in our own area. Although we were aware of some nationally recognized
56 athletes and celebrities praising such services, we were surprised to learn they had reached our
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5 own backyard—rural eastern North Carolina. Figure 2 presents the menu from the “medical spa”
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7 our patient asked about. We were curious what information the potential patient would receive
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9 and so called to inquire about an appointment without disclosing any information about our own
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11 health conditions. The receptionist said that they would provide an IV infusion of a mixture of
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13 vitamins administered by a certified medical professional with a price ranging from \$70-180
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15 depending on what we desired. No medical referral was required.
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21 **Asking our colleagues.**

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24 We were curious if our physician, nursing, and nutrition colleagues were as unaware as we
25
26 were of IVVT. With a few exceptions, those with strong interests in Lifestyle Medicine, most
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28 were like us—unaware. We were told about infusion centers, often on an academic health
29
30 center campus, that offered IVVT. The treatments offered included both those a patient might
31
32 receive in the hospital but with more convenience and less cost at an infusion center as well as
33
34 unproven treatments for conditions like fibromyalgia, immune support, and hangovers.
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38 **Our Findings**

39 **Claims vs Evidence of Benefit.**

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42 Benefits. Many people first hear of “drip bars” as a place to obtain relief by having a “hangover
43
44 bag” filled with saline. These are not the same as the so called “banana bags” used to treat the
45
46 rare clinically meaningful vitamin deficiencies seen in patients presenting to the Emergency
47
48 Department with alcohol related illness (11). In a systematic review of hangover cures, IVVT
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50 was not mentioned (12).
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5 The benefits of an IV administration of fluids, vitamins and minerals is the speed, and the
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7 bioavailability of the nutrients is 100% in some instances (13). This is different from what
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9 happens when you are taking vitamins and minerals orally as dietary supplements, with the
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11 micronutrients (particularly the minerals) often not being completely absorbed in the gut (13).
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13 For example, with an IVVT bag of vitamin C, administered in the hospital, Integrative Medicine
14
15 clinic or hydration room, the vitamin C goes straight to the blood stream, skipping the entire GI
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17 system. IV fluids are medicines, not dietary supplements, but the many of the spas promote
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19 them often using the same "structure and function claims" allowed by the Food and Drug
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21 Administration on labels for dietary supplements.
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28 Placebo or Too Small a Sample to Detect a Beneficial Effect? Ali and coworkers (9) conducted
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30 a pilot study to establish the safety and feasibility of treating fibromyalgia with IVVT. The
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32 participants reported relief relative to their own baseline pain. Those receiving IVVT reported
33
34 greater relief, but the difference was not statistically significant among those who received
35
36 Lactated Ringer 's Solution (a sodium lactate solution used to replace fluids and electrolytes in a
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38 person with low blood volume or low blood pressure. Gaby (5) provides a discussion of the
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40 theoretical basis for IV nutrient therapy that many of the current clinics use as their reasoning.
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42 He notes that nutrients delivered quickly and at higher concentrations than possible when taken
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44 orally may have direct pharmacological effects or that they more effectively correct intracellular
45
46 nutrient deficits. Gaby's provides case reports of successful treatment of asthma, migraine,
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48 fatigue, fibromyalgia, depression, cardiovascular disease, upper respiratory tract infection,
49
50 narcotic withdrawal, chronic urticaria, athletic performance and hyperthyroidism with IVVT (5).
51
52 He concludes that while most of the evidence is anecdotal, the "Myers' cocktail" has been found
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54 to be safe by himself as well as hundreds of other practitioners. Gaby calls on others to report
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56 their findings (5). Alan Gaby MD is a past president of the American Holistic Medicine
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4 Association and took over the care of Dr. John Myer's patients after his death in 1984. Dr.
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6 Myers is credited with pioneering the use of IV vitamin and mineral treatments for various health
7
8 conditions (5).
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10 11 **Concerns**

12 Misuse of scarce resources. In a 2014 editorial published in the Journal of Parenteral and
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14 Enteral Nutrition, Chan, and colleagues (14) raised concerns about the use of scarce resources-
15
16 - using IV hydration solutions, a prescription medication-- for unproven purposes, such as
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18 hangovers and colds, over established medical needs. Colleagues working on hospital Nutrition
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20 Support teams note there always seems to be a shortage of some resource. Currently there is
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22 a shortage of IV multivitamins that is leading to rationing. There also is concern that an IV
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24 thiamine shortage may occur.
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34 **Risks**

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36 Common risk of IV therapy. The most common risks in receiving traditional IV therapy include
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38 phlebitis, extravasation (damage caused when fluid leaks out of its container into surrounding
39
40 tissue during an IV infusion), air embolism, hypervolemia or fluid overload in the body, and
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42 infection from the breaking of the skin. It is beyond the scope of this paper to describe the
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44 dosages and frequency of administration that lead to these risks. Although we did not find
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46 reports of major medical adverse consequence from routine use of IVTT, we believe it is
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48 appropriate to raise awareness of potential problems. There may be a risk of toxicity of
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50 antioxidants and minerals, depending on "how much", "how often" and "to whom" they are
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52 provided.
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4 Toxicities. Clinical dietitians express concern about the dangers of electrolyte infusion without
5 benefit of knowing the person's laboratory values, medical conditions or current medicines and
6 dietary supplements. They voice concern about the dangers of fluid infusions in specific
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11 populations like individuals with chronic obstructive pulmonary disease (COPD), renal failure, or
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13 congestive heart failure. In the hospital setting the need for monitoring the administration by an
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15 interprofessional team is recognized and charts are reviewed prior to administering therapies.
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22 It appears at least from our brief review of websites that the solutions used in integrative and
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24 primary care practices are prepared by licensed pharmacies which would remove the risk
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26 potential toxicities or drug-nutrient interactions. Too much or too little of particular nutrients can
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28 do harm. For instance, if you receive mega doses of vitamin C, the body produce more oxalate
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30 which increases the risk of oxalate kidney stones (6). However, too little in a person's diet will
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32 cause poor wound healing and eventually scurvy (6).
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39 A detailed discussion of the side effects of imbalances of specific fluids, electrolytes, minerals,
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41 and/or vitamins is beyond the scope of this article. However, we note a few of the more serious
42
43 potential side effects. Many acute changes in electrolytes, namely such as overdoses of
44
45 potassium, can lead to fatal cardiac arrhythmias (15). Rapid correction of sodium with isotonic
46
47 saline can lead to brain herniation—a shift of cerebral tissue from its normal location due to
48
49 factors that cause mass effect and increased intracranial pressure, or pontine stroke—a type of
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51 ischemic stroke that affects the pons region of the brain stem. Another concern is increased risk
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53 of overhydration or water intoxication, if having weekly IVVT, resulting in confusion, headache,
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55 nausea, and vomiting. Rapid accumulation of magnesium can lead to increased neuronal firing,
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57 leading to a variety of neurologic symptoms such as confusion, tingling pains, and muscle
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4 weakness/tremors (16). Hypercalcemia leads to kidney stones, bone pains, and constipation.
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6 The fat-soluble vitamins (A, D, E, and K) are less easily excreted than the water-soluble
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8 vitamins and may present a higher risk of toxicity. Many people do not realize that some water-
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10 soluble vitamins also have established Upper Tolerable Limits and may exceed their UL with
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12 very large IV amounts being administered thereby posing an adverse health effect. Vitamin K
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14 plays a positive role in the formation of coagulation factors in the blood clotting cascade. With
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16 that in mind, some blood thinners can become subtherapeutic as Vitamin K levels increase,
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18 thereby increasing the risk of clots and sabotaging the intended therapy (6). Vitamin A toxicity
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20 can cause changes in vision if the liver's capacity to store the vitamin is overwhelmed (6).
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28 **Safety**

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30 Under U.S. law, IV hydration solutions (e.g., sodium chloride 0.9%), electrolytes, vitamins, and
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32 trace minerals are prescription drugs (13). These hydration solutions are to be used for medical
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34 purposes and administered by medical professionals. While the websites for Integrative Medical
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36 practices typically list their staff and qualifications including allopathic and osteopathic
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38 physicians (MD, DO), Doctor of Chiropractic (DC), Naturopathic Doctors (DN), Nurses (RN),
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40 Physician Assistants and Nurse Practitioners (PA, NP), other business websites have
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42 statements like, "All of our staff are highly trained in the medical field and are experts at placing
43
44 IVs", or "we employ highly trained practitioners who are licensed or certified". We were unable
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46 to determine if businesses in all states are required to have a specific licensure or oversight as
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48 to who prescribes, prepares, and/or administers the IVVT bag (14). We found links to online
49
50 courses on "how to start this business for yourself" or obtain a franchise (10, 17). It appears that
51
52 some clinics have a full medical staff and licensed pharmacy; others are owned and registered
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54 under a licensed medical professional who may (e.g., MD, DO) or may not (e.g., RN) have
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56 prescriptive authority. A medical director with prescriptive authority may or may not be on-site.
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Conclusion

With more oversight and communication between primary care providers and outpatient clinics that provide IVVT conveniently and at a reasonable cost may be helpful for patients who are post GI surgery or have Crohn's disease, ulcerative colitis or other conditions affecting nutrient absorption. Although Dr. Gaby reports that the "Myer's Cocktail" is safe there are no reports to prove that it nor other IVVT are efficacious. There is insufficient evidence suggesting that IVVT is more effective than eating food or taking dietary supplements to reduce the risks of vitamin and mineral deficiency or support immune health. Our take-away from this experience is that IVVT sold in the retail space is an expensive and over-hyped alternative to oral intake of nutrients and fluids. Frequent use of IVVT may cause critical nutrient imbalances, negative interactions with medications and/or increased risk of infection. Like Paracelsus, we err on the side of caution with excess and think routine IVVT to people outside of the hospital and clinic setting or for "wellness" needs further investigation into the risks and benefits. We reviewed these risks and benefits with our patient and suggested she accept an appointment with a Registered Dietitian Nutritionist (RDN) to review her typical dietary and fluid intake and create a plan to address any shortfalls with food, beverages. or over-the-counter dietary supplements.

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51 Call Outs

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54 Consumers with hopes of having healthier skin, killing a cold, strengthening
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56 their immune system, curing a hangover or obtaining feeling of wellness.
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The benefits of IV administration of vitamins, minerals and fluid is the speed and bioavailability

Worries about the dangers of electrolyte infusion without the benefit of knowing the person's laboratory values, medical conditions or current medicines and dietary supplements

Is expensive and overhyped alternative to oral intake of these nutrients

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

Figure 1. Nutrients in Myer's Cocktail

Figure 2. Example of Menu from a Spa Offering IV Therapy in a rural area.

The Mother to Be: \$119: Pregnancy and morning sickness relief. Reglan, Folic Acid, Pepcid

The Myer's Cocktail: \$169. The OG Drip for fibromyalgia, chronic fatigue, migraines, chronic sinusitis, asthma and more! B Complex, Vitamin C, Calcium, Magnesium

The Road Runner: \$139. For an energy boost and jet lag relief. Taurine, Toradol, B12, Glutathione, O2.

The Rewind: \$189. To help support an anti-aging regimen. B Complex, Mineral Complex, High Dose Glutathione, CoQ-10, Vitamin C, O2.

The Dr. Yap: \$125. Special Wellness Formula by Licensed Naturopathic Doctor, Dr. Yap
Specially formulated blend for Hydrating

The Tune Up: \$129 To help with joint pain, body aches and inflammation.
Decadron, Toradol, B12

The Orange Juice: \$139. High Dose Vitamin C

Add-On Options: Alpha Lipoic Acid \$35; B-12 \$15; B-12 IM injection \$45; B- Complex \$29;
Bentyl \$5; Benadryl \$10; CoQ-10 \$25; Extra Bag of Fluid \$40; Folic Acid \$20; Glutathione \$20
Iron Infusion \$200; Multi Trace 5 \$15; Oxygen Therapy \$15 for 20min; Pepcid \$12; Phenergan
\$15; Reglan \$12; Taurine \$25; Thiamine \$29; Toradol \$12; Vitamin C \$15; Vitamin D \$60;
Vitamin D Mega Dose \$120; Zinc \$20; Zofran \$12; Decadron \$20

From <https://www.driveiv.com/iv-therapy-menu>. Accessed March 20, 2021

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Figure 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

Figure 2. Example of Menu from a Medi Spa Offering IV Therapy in a rural area.

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Author Bio

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Call Outs/Sidebars

Call Outs

Consumers with hopes of having healthier skin, killing a cold, strengthening

their immune system, curing a hangover or obtaining feeling of wellness.

The benefits of IV administration of vitamins, minerals and fluid is the speed and bioavailability

Worries about the dangers of electrolyte infusion without the benefit of knowing the person's laboratory values, medical conditions or current medicines and dietary supplements

Is expensive and overhyped alternative to oral intake of these nutrients