

Naturopathic Injection Therapies:

An Introduction



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This article introduces the reader to modern naturopathic medicine in North America and gives a cursory overview of three emerging treatment modalities within the specialty of naturopathic pain medicine. This article is abbreviated from the chapter entitled, “Naturopathic Pain Medicine” included in the forthcoming *Weiner’s Pain Management: A Practical Guide for Clinicians*, Seventh Edition.

Naturopathic medicine is defined as a distinct system of primary healthcare—an art, science, philosophy, and practice of diagnosis, treatment, and prevention of illness.¹ Naturopathic physicians (NDs) are primary healthcare providers who blend contemporary conventional scientific knowledge with a spectrum of natural medicine modalities; they are physician-level practitioners trained in the broadest range of conventional and natural medicines. Naturopathic medicine is distinguished by the principles that underlie and determine its practice rather than by its broad treatment modalities. The guiding principles of naturopathic medicine are as follows:

1. The Healing Power of Nature (*vis medicatrix naturae*).
2. Identify and Treat the Cause
3. Treat the Whole Person
4. First Do No Harm
5. Doctor as Teacher
6. Prevention

We will now briefly examine three modalities used by practitioners of naturopathic pain medicine: intravenous micronutrient therapy (IVMT), regenerative injection therapy (RIT), and mesotherapy.

Intravenous Micronutrient Therapy

Intravenous micronutrient therapy—more specifically, the “Myers’ Cocktail” (see table 1)—is a popular treatment modality among NDs for the treatment of acute illness, chronic disease, and pain syndromes.

IVMT has the ability to achieve serum concentrations of micronutrients far beyond what is possible with oral or intramuscular administration. The highest serum vitamin C level reported after oral administration of pharmacological doses is 9.3mg/dL; however, IV administration of 50g/day of vitamin C resulted in a mean peak plasma level of 80mg/dL.² Similarly, oral supplementation with magnesium has been shown to minimally impact serum magnesium levels, whereas IV administration can double or triple the serum levels.³

Much of the benefit of the Myers’ Cocktail in the treatment of painful syndromes is believed to be derived from the magnesium content.⁴ Magnesium administered intravenously has been shown to have an analgesic effect for a number of conditions.⁵⁻¹² Magnesium is a coenzyme in over 300 enzyme reactions, and in healthy states, magnesium levels are second only to potassium intracellularly.¹³ Magnesium has been found to be low in the serum¹⁴⁻¹⁵ and erythrocytes¹⁶ and high in the hair¹⁷ of fibromyalgia syndrome (FMS) patients, suggesting dysfunction of magnesium regulation in this population. Gaby hypothesizes that the reduced levels of intracellular magnesium found in FMS patients plays a role in the etiology, and in order to adequately replenish the cells with magnesium, it is necessary to attain extremely high levels in serum, possible only with IV administration.¹⁸

Migraineurs share physiological irregularities with FMS patients, such as serotonin

Table 1
Contents of the Myers' Cocktail

Magnesium chloride hexahydrate (20%)	5 ml
Calcium gluconate (10%)	3 ml
Hydroxocobalamin (1,000 mcg/ml)	1 ml
Pyridoxine hydrochloride (100 mg/ml)	1 ml
Dexpanthenol (250 mg/ml)	1 ml
B-complex 100*	1 ml
Vitamin C (222 mg/ml)	10 ml
Sterile Water	20 ml

*B-Complex 100 contains the following per each ml:

Thiamine HCl	100 mg
Riboflavin	2 mg
Pyridoxine HCl	2 mg
Panthenol	2 mg
Niacinamide	100 mg
Benxyl Alcohol	2%

imbalance,¹⁹ lowered pain threshold, and generalized hyperalgesia.²⁰ Like FMS patients, migraineurs have been found to have reduced red and mononuclear blood cell magnesium levels.²¹ Two double-blind studies have shown that chronic oral magnesium supplementation may reduce the frequency of migraine headaches,²² and one pilot study suggests that IV magnesium can resolve an acute migraine.²³ Magnesium concentration plays a role in the modulation of serotonin receptors, nitric oxide synthesis and release, and a variety of other neurotransmitters.²⁴

Reed describes his clinical experience as having shown the beneficial effect of parenteral magnesium therapy in treating two groups of patients: those with acute sprains, contusions, or soft tissue injuries, and those with chronic muscular complaints including myofascial pain, relapsing soft tissue injuries, and FMS.²⁵

Based on research to date, some conjecture can be made regarding the role of magnesium. However, the roles of the other constituents of the IVMT solution have not been investigated extensively. Nonetheless, vitamin B-12 injected

intramuscularly has been used experimentally to treat CFS, a syndrome closely associated with FMS.²⁶ In one un-blind trial, 2,500-5,000 (g of vitamin B-12, given by injection every two to three days, led to improvement in 50-80% of a group of people with CFS, with most improvement appearing after several weeks.²⁷ It has been suggested that oral or sublingual administration does not achieve the effects seen with injectable B-12.²⁸

Previously, an erroneous belief linked the intake of large amounts of vitamin C to the formation of oxalate-type kidney stones because of the metabolic conversion to oxalic acid. If the amount of oxalic acid in the urine increases as the dose of vitamin C increases, it was postulated that a prolonged intake of large amounts of vitamin C might cause kidney stones. No data exist, however, to support this speculation, and in fact, data clearly refute this idea.²⁹ Curhan et al. conducted a fourteen-year study to examine the association between the intakes of vitamins B-6 and C and the risk of kidney stone formation in 85,557 women.³⁰ They found that a high intake of vitamin B-6 was inversely associated with the risk of stone formation and vitamin C intake was not associated in any way with that risk.

Regenerative Injection Therapy (RIT)

In simplest terms, regenerative injection therapy (also known as prolotherapy) is the injection of a hypertonic solution containing a local anesthetic directly into damaged connective tissues with the purpose of triggering the response of the body's natural healing mechanisms.³¹ RIT is of particular interest to NDs practicing naturopathic pain medicine, because it is believed that it directly addresses the cause of pain and allows the body to heal itself naturally.

While there is a relative paucity of data examining RIT, one of the best constructed trials was conducted by Reeves and Hassanein in 2000. They found that intra-articular injection with 10% dextrose resulted in clinically and

statistically significant improvements in pain associated with knee osteoarthritis. Blinded radiographic readings at one year post treatment demonstrated improvement in several measures of osteoarthritic severity. Additionally, it was found that ACL laxity, when concurrently present in this patient group, improved as well.³²

A common naturopathic aberration of RIT/prolotherapy is the addition of glucosamine sulfate (GS) to the injected solution in the treatment of OA of the knee. Oral administration of GS has been shown to be effective in the treatment of the pain associated with OA of the knee as well as in the delay of the progressive degeneration.³³⁻³⁶ Glucosamine, formed in the body as glucosamine6 phosphate (G6P), is the most fundamental building block required for the biosynthesis of glycolipids, glycoproteins, glycosaminoglycans, hyaluronate, and proteoglycans. GS's mechanism of action in reversing joint degeneration appears to be due to its ability to act as an essential substrate for, and to stimulate the biosynthesis of, the glycosaminoglycans and the hyaluronic acid backbone used in the formation of the proteoglycans found in the structural matrix of the synovium. Taken orally, GS concentrates in the liver, where it is incorporated into plasma proteins, degraded into smaller molecules, or utilized for other biosynthetic processes. Although absorption is high, a substantial quantity of the absorbed glucosamine is probably modified or degraded to smaller compounds, such as H₂O, CO₂ and urea.³⁷

From these data, it seems reasonable to inject GS directly into an osteoarthritic joint—to put the medicine right where it is needed. Klein et al. conducted a pilot study to test the potential effectiveness of intradiscal injection therapy using an RIT solution, which included GS, in the treatment of intervertebral disc disease. Thirty patients with chronic intractable discogenic low back pain took part in the study. Affected lumbar intervertebral discs were injected with a solution of glucosamine and

chondroitin sulfate combined with hypertonic dextrose and dimethylsulfoxide (DMSO). Assessment of pain and disability was completed before treatment and 12 months after the last treatment. Although the results were statistically significant for the 30 patients as a whole, 17 of the 30 patients (57%) improved markedly with an average of 72% improvement in disability scores and 76% in visual analogue scores. The other 13 patients (43%) had little or no improvement. Patients who did poorly included those with failed spinal surgery, spinal stenosis, or long-term disability.³⁸ Derby et al. also conducted a pilot study that compared “Intradiscal Restorative Injections” containing GS to Intradiscal Electrothermal Treatment (IDET) in the treatment of discogenic disc pain. They found that restorative injections were slightly more effective than IDET in reported pain 6-18 months post procedure and much improved in cost-benefit ratio.³⁹

Yelland, et al. recently conducted a trial use of RIT/prolotherapy on 110 patients. They assessed the efficacy of a prolotherapy injection versus the injection of saline with or without an exercise protocol in the treatment of chronic nonspecific low back pain. Their findings demonstrated that significant and sustained reductions in pain and disability occur with ligament injections, irrespective of the solution injected or the concurrent use of exercises.⁴⁰ This datum suggests that the mechanism of action of RIT may be found more in the mechanical disruption and subsequent local inflammation caused by the manipulation of the needle and stimulation of intracellular growth factors by the compression of cells by the injected solutions than by any specific chemomodulation caused by various ingredients used.

Mesotherapy

While mesotherapy, along with its applications to pain and sports medicine, is almost entirely unheard of in the United States, it is a front-line

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therapy in the treatment of pain in other countries. Mesotherapy appears to be a safe and effective emerging modality in naturopathic pain medicine.

Mesotherapy is essentially a unique style of injection using pharmacologic and natural preparations. The specialized techniques are various superficial injections using specialized short needles directly over the site of the affected structure.⁴¹

The premise of mesotherapy is that solutions injected intracutaneously remain in the injected area longer than a deeper injection because they are slower to be cleared by general circulation. It is postulated that the injected solutions continue to penetrate the deeper tissues. Kaplan and Raincourt injected salmon calcitonin marked with a radioisotope and found upon serial scans that the more superficial the injection, the longer the solution remained in the area.⁴² LeCoz and DuPont conducted an experiment on patients scheduled to undergo arthroscopic surgery of the knee. The subjects were divided into three groups. The first group received intraepidermic papules of a diluted NSAID, the second group received injections of the same amount of the same solution using 4mm needles, and the third similarly received deep intramuscular injections. At hours one and three post injection, venous blood draws were performed to determine serum levels of the NSAID. It was found that, uniformly, the shallower the injection, the less of the substance was found in venous circulation at both one and three hours post injection. During arthroscopy, synovial biopsies were performed, and all groups were found to have NSAID present, although levels were not determined.⁴³ Mesotherapy, therefore, appears to be a novel technique to administer medicines where the skin acts as a natural time-release system.

A mesotherapy solution is generally a base solution with the addition of whichever medication is indicated. The base solution is a local anesthetic and a drug from the class vasodilator, such as pentoxifylline.

Of particular interest is the French mesotherapists' use of salmon calcitonin (sCT) in the treatment of a broad spectrum of chronic pain disorders. Salmon calcitonin is best known as an antiosteoporotic agent, but its analgesic effects in the treatment of acute osteoporotic fracture has been well documented.⁴⁴⁻⁴⁷ Further studies have examined the antinociceptive properties of sCT for a range of disorders, including advanced metastatic malignancy,⁴⁸⁻⁵⁰ reflex sympathetic dystrophy,⁵¹ phantom limb pain,⁵²⁻⁵³ and diffuse sclerosing osteomyelitis of the humerus.⁵⁴ One animal study demonstrated sCT's ability to potentiate the analgesic effect of amitriptyline and paroxetine.⁵⁵

The mechanisms of analgesic action of sCT are believed to be multifactorial.⁵⁶ An antiinflammatory action has been suggested.⁵⁷ Studies in animals and in humans demonstrate that in some, but not all, cases, sCT increases plasma beta-endorphin levels.⁵⁸ It is possible that specific binding sites for sCT exist in the brain.⁵⁹

Currently, the majority of scientific data in the field of mesotherapy regarding the treatment of pain and sports medicine are in the French language and consist of clinical case series. One such clinical case series showed mesotherapy to be beneficial in the treatment of 65 patients suffering from chronic thoracic back pain from arthritis, spinal stenosis, and sprain/strain that was not adequately controlled using conventional methods (NSAIDs, narcotic analgesics, muscle relaxants, and physiotherapy).⁶⁰ Another paper describes the results of having treated 267 cases of degenerative arthritic pain, and shows mesotherapy to be an effective and reasonable treatment option, especially in light of the absence of adverse side effects or reactions in the treatment group.⁶¹ Another paper describes the mesotherapeutic treatment of 210 patients with various soft tissue musculoskeletal pain whose pain was not satisfactorily controlled with conventional methods. These patients were

treated mesotherapeutically with local anesthetics, NSAIDs, sCT, and a non-sedating centrally acting muscle relaxant (thiocolchicoside), and again showed mesotherapy to be a reasonably effective treatment option, especially in light of poor patient tolerance of the most commonly used interventional option, injection of corticosteroids.⁶² Another paper describes the use of mesotherapy on 132 cases of patients with back and neck pain that had not been ameliorated by at least three months of conventional treatment. Findings showed mesotherapy to be a promising treatment option in terms of safety and efficacy.⁶³ Mesotherapy has been shown to be helpful in a variety of commonly seen sports medicine conditions, such as Achilles tendonitis.⁶⁴

Conclusion

Many patients with pain seek alternative healthcare because of philosophical leanings or dissatisfaction with conventional care. Naturopathic physicians specializing in naturopathic pain medicine have a large armamentarium of traditional and cutting-edge modalities available to them. This article is meant to scratch the surface of those modalities. According to the small amount of data available, naturopathic pain medicine appears to be safe, effective, and cost-effective.

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