

흔한 증상 및 질환에 대한 정맥 영양치료

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연수강좌

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- Application for IVNT
- “피로해요”
- “바이러스성 질환”
- “머리가 아파요 ”
- “다리가 저려요”- Muscle cramp

Intravenous Nutritional Therapy(IVNT)

- 비타민 및 미네랄, 아미노산 등을 이용하여 혈액내로 직접 주입하여 치료효과를 내는 방법

History of Myers' Cocktail

- John Myers – physician from Baltimore
- Myers 는 1959년 부터 25년 동안 IVNT 치료함
 - IV 치료 성분에 대한 어떠한 출판물이나 자료를 남기지 않음.
- Myers 는 10-mL 주사기를 사용하여 slow IV push
- 현재의 제제는 Alan R. Gaby가 Myers가 1984년 사망 이후에 그의 환자들을 돌보면서 만들어 낸 것임.

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
Dexpantenol (250 mg/ml)	1 ml
B-complex 100*	1 ml
Vitamin C (500 mg/ml)	5 ml
Sterile Water	20 ml
총 부피	37 ml
• B-complex 100*	
Thiamine HCl, Niacinamide 각각	100mg
Riboflavin, Pyridoxine HCl, Panthenol 각각	2mg
Benzyl Alcohol	2%

The Myers' Cocktail: biochemical pathways affected

- Krebs' cycle
- Detoxification pathways
- Methylation pathways
- Oxidative stress
- Oxidation phosphorylation

Modified Myers' cocktail

	20% Mg	10% Ca gluconate	B5 250mg/ml	B6 100mg/ml	B12 1,000mcg/ml	B com 100	Vit C 222mg/ml	Sterile water ml	Others
일반적인	2-5	1-3	1	1	1	1	4-20	8	weekly
천식	3	3	1	1	1	1	10	8	3 times over 4 days, 간혹 유지요법 1주 - 2주 간격
관통통	5	4	1	2	1	1	16	8	Once, 몇 분만에 효과
피로	4	2	1	1	1	1	6	8	Weekly → twice monthly
섬유근육통	4	2.5	1	1	1	1	6	8	Weekly → twice monthly → monthly
우울감	5	x	1	1	1	3	x	8	Weekly → twice monthly → monthly
심혈관질환	5	x	1	1	1	1	x	8	Weekly, Mineral add
호흡기질환	3-4	1.5-2					20	8	daily
알러지 비염	3	x	1	1	1	1	12	8	daily
Narcotic withdrawal	5	2.5	1	1	1	1	16	8	daily
만성두드러기	3	1.5	1	1	1	1	12	8	daily
운동 수행능 향상	5	2.5	1	1	1	1	16	8	Once or twice weekly
갑상선기능항진증	4	2	1	1	1	1	6	8	Once or twice weekly

Alan R. Gaby Alter Med Rev 2002;7(5): 389-403

IVNT 종류

- Myer's cocktail – Fatigue, Adrenal Exhaustion, Pain
- IV High dose Vitamin C – Infection, Allergy, Cancer, FM/CFS
- IV magnesium – CFS, Asthma, CAD, Pain, Spasm, IBD,
- IV Glutathione - Allergy, Memory loss, Detox
- IV Lipoic acid -
- IV or SQ Laennec^①
- IV selenium
- IV Amino acid, arginine
- IV carnitine
- IV chelation – Heavy metals, CAD, pain

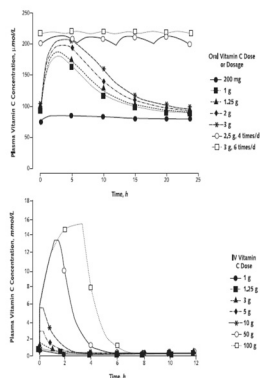
Rationale for IV therapy

1. 소화 효소의 작용에 의해 일어날 수 있는 영양소의 변형을 피하여 직접적으로 세포 영양 공급
2. 경구용 제제의 농도보다 더 높은 세포내 및 세포외 농도가 가능
3. 즉각적인 치료 효과 기대
4. IVNT가 세포내 영양소 결핍을 해결할 수도.
 - 적절한 세포 기능을 유지하기 위해 영양소의 높은 세포내 농도가 필요;
 - 마그네슘 농도는 심근 세포내 농도가 세포외 농도에 비해 10 배 이상 높다.

Theoretical Basis for IVNT

- 다양한 영양소들이 약물학적 효과가 나타나는데, 이는 영양소의 농도에 따라 다르다.
 - 예; 비타민 C 의 항바이러스 효과; 10-15 mg/dL 혈중 농도에서 나타나는데, 이는 경구용에서는 불가능하며, 정맥주사에서 가능함.
 - 항히스타민 효과; 88mg/dL in vitro
- 마그네슘 이온은 혈관과 기관지 평활근육의 이완을 촉진
 - 혈관경직성 협심증 혹은 기관지 천식의 급성 발작에서 효과를 나타내기도.
 - 경구용 마그네슘은 용량을 올려도 혈중 농도 상승이 없으며, IV 정주시 2-3배 증가 가능

Predicted plasma vitamin C concentrations in healthy persons after oral (top) or intravenous (IV) (bottom) administration of vitamin C



Administration	Serum concentration
Oral, 200mg/day	1.2mg/dL
Oral, 2500mg/day	1.5mg/dL
Oral, highest concentration	9.3mg/dL
IV 50g/day	80mg/dL

Ann Intern Med. 2004;140:533-537.

Window of opportunity on ailing cells

- 짧은 시간이지만 높은 농도의 혈중 영양소
 - 작은 농도 차이에도 불구하고 세포내로 영양소 이동
 - 세포 외로 영양소 이동이 있기 전에 기능회복(healing)이 일어남
 - 반복적으로 세포내 영양소가 충만(Flooded)
 - 충만과 회복이 축적되면서, IVNT 간격이 늘어나거나 중단 가능할 수도
- 주사 시간이 짧을 수록 효과지속 기간이 길어지고, 주사 시간이 길 수록 효과 지속기간이 짧아진다.

Common Applications of IVNT

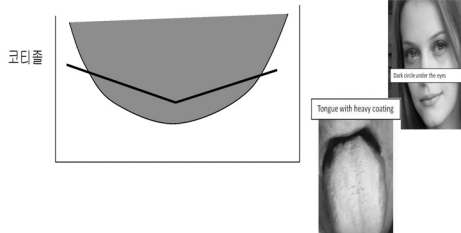
- 다양한 이유로 전반적으로 건강하지 않다고 느끼는 환자
- 부신(만성적인 스트레스로 인한) 피로를 포함한 만성피로 증후군
- Fibromyalgia
- Asthma
- Migraines
- Acute muscle spasm
- Chemical toxicity secondary to any exposure to chemicals
- Allergic diseases
- Acute viral diseases
- Urticaria including Acne
- Cancer

IVNT 주의사항

- 적정 osmolarity 유지; 정상 혈액 osmolarity 275-308 mOsm
- Calcium gluconate --- digoxin 사용시 금기, 부정맥 유발, 부작용 및 보관문제로 사용 권장 안함
- 미네랄은 보통 아미노산 수액 혹은 다른 수액에 첨가
- 잠전 가능성
NaHCO₃ - Selenium, B12, Folate, Calcium gluconate
Vit C - B12
Lipoic acid - Minerals
- 차광 필요 - lipoic acid
- 비타민 C 차광 불필요
- 비타민 B12는 빠르게 소변으로 배설되어 IM 선호
- Glutathione, Lipoic acid, Selenium 및 아미노산 제제는 IVNT(비타민 C)와 분리하여 정주

부신기능 저하시 피로 특징

- TMA 상 Na/Mg < 4.0:1
- 혈액, 타액 검사상 코티졸 감소
- 아침에 깨운하지 않으며: arousal 효과
- 감정변화(우울과 불안) 심함
- 저녁 7-8 시경이 컨디션이 가장 좋은 특징을 보임



사용하는 IV 제제

- Gulucolin® /Kyominotin® 2 ample
Glycyrrhizinate 53mg
Glycine 400mg
Cysteine 15.37mg
- Magnesium
Mg 2000 mg
- Beecom hexa 1 ample
Nicotinamide 40mg
B1 10mg
B12 10µg
B2 5.47mg
B6 5mg
Dexpanthenol 5.17mg
- Pantothenic acid 500mg
- Thiamine 100mg
- Pyridoxin 100mg
- Vit C 10g
- Bivon 8 cc NaHCO₃
- Glutathione
- Selenium
- Lipoic acid
- B12 1000ug
- Amino acid, arginine

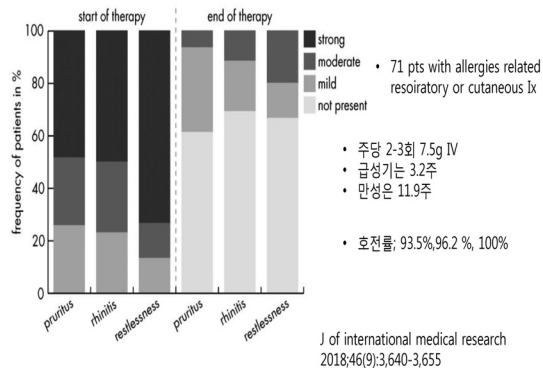
만성피로시 IVNT

- MgCl 10 cc(2.0g)
- Pantothenic acid (B5) 2 cc (500mg)
- Pyridoxine(B6) 2 cc (50mg)
- Vitamin C 20 cc(10g)
- Bivon 8 cc
- B-complex 1 ample
- B1 100 mg
- Glycyrrhizic acid 2 ample
- Reduced Glutathione 10 cc(600mg): 따로 IV, 경우에 따라서
- Selenium,0.9% N/S 100 ml 0.5 - 1 ample: 따로 IV
- Arginine 10g : 따로 IV

Vitamin C

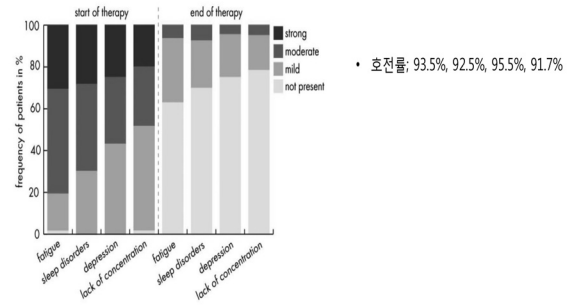
- ↓ oxidative stress upon the mitochondria
- ↓electron leakage which has been associated with **fibromyalgia & CFS**
- Supports adrenal gland function
- Coenzyme for the conversion of L-dopa to NE: an important part of the physiologic stress response

Intravenous Vit C in the treatment of allergies



J of international medical research
2018;46(9):3,640-3,655

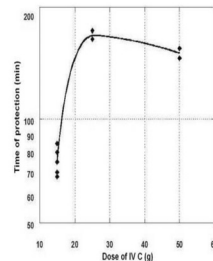
Intravenous Vit C in the treatment of allergies



J of international medical research
2018;46(9):3,640-3,655

Intravenous vitamin C in the supportive care of cancer patients: a review and rational approach

Sterile water (mL)	Vitamin C (g)	Osmolarity (mol/L)	Infusion duration (min)
150	5	375	30
250	10	440	30-60
350	15	469	30-60
500	20	440	60-90
500	25	540	60-120



Curr Oncol. 2018 Apr;25(2):139-148

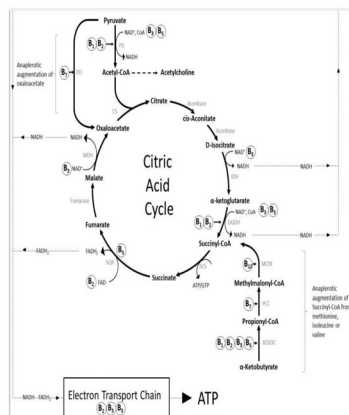
Intravenous Vitamin C in the treatment of shingles: Results of a multicenter prospective cohort study

Efficacy rating	Previous		Ascorbic acid	
	n	%	n	%
Good efficacy	14	37.8	35	92.1
Moderate efficacy or no effect	23	62.2	3	7.9
Total	37	100.0	38	100.0
Fisher's exact test previous medication vs. ascorbic acid	P<0.0001			

- Vitamin C intravenously (7.5 g/50 ml, 2–4 times/week) for approximately 2 weeks in addition to standard treatment
- Beneficial effects on herpes zoster-associated pain, dermatologic findings and accompanying common complaints such as general fatigue and impaired concentration
- The risk of developing PHN was reduced.

Med Sci Monit, 2012; 18(4): CR215-224

The role of B-vitamins in mitochondrial energy production



경도의 티아민 결핍의 증상

- 피로, 과민성, 집중력 장애, 우울증, 손과 발의 감각 불타는 감각 등과 같은 비특이적 증상
- 정상 혈중 비타민 B1 농도이면서 경미한 티아민 결핍 증상이 나타나는 것은 세포 내 티아민 수송 또는 구조적 효소 이상의 기능 장애 때문일 수 있다.

Thiamine and fatigue in inflammatory bowel diseases: an open-label pilot study

TABLE 1. THIAMINE, TPP AND CFS SCORES BEFORE THE THERAPY				TABLE 3. THIAMINE, TPP AND CFS SCORES AFTER THE THERAPY			
	Thiamine, n.v. 2.1-4.3 µg/L	TPP, n.v. > 49 µg/L	CFS scores		Thiamine, n.v. 2.1-4.3 µg/L	TPP, n.v. > 49 µg/L	CFS scores
Ulcerative C.				Ulcerative C.			
Patient				Patient			
1	12.6	77.1	26	1	20.64	137.6	0
2	8.6	76	9	2	69.0	118.0	0
3	6.6	92	14	3	34.4	115.5	0
4	10.5	140	10	4	177.1	180.1	5
5	3.9	74	17	5	23.2	122.9	0
6	7.8	95.4	13	6	56.7	141.0	0
7	12.8	78.5	9	7	71.8	156.4	3
8	12.05	91.7	13	8	181.7	161.58	0

TABLE 2. THIAMINE, TPP AND CFS SCORES BEFORE THE THERAPY				TABLE 4. THIAMINE, TPP AND CFS SCORES AFTER THE THERAPY			
	Thiamine, n.v. 2.1-4.3 µg/L	TPP, n.v. > 49 µg/L	CFS scores		Thiamine, n.v. 2.1-4.3 µg/L	TPP, n.v. > 49 µg/L	CFS scores
Crohn's D.				Crohn's D.			
Patient				Patient			
1	20.64	119.0	8	1	87.5	137.0	0
2	13.6	100.22	7	2	118.2	180.0	0
3	12.6	77.1	13	3	56.7	141.0	0
4	12.05	91.7	9	4	22.0	132.6	0

J Altern Complement Med. 4 Feb 2013.

High dose thiamine improves fatigue in multiple sclerosis

Patient	Thiamine (n.v. 2.1-4.3 µg/L)*		TPP (n.v. >49 µg/L)*		FSS scores	
	Before	After	Before	After	Before	After
1 ^{ab}	7.0	8.4	91.0	48	38	15
2 ^a	6.6	73.1	86.2	65.1	37	18
3 ^{ab}	6.3	10.8	50.8	119.4	30	14
4 ^d	4.1	7.9	38.8	78.0	51	38
5 ^d	11.4	18.4	89.5	101.7	61	34
6 ^d	8.2	14.4	72.9	40.1	49	40
7 ^d	9.2	14.8	45.2	47.4	55	55
8 ^a	8.4	36.4	105.4	73.2	38	21
9 ^a	7.3	102.7	73.1	72.8	42	14
10 ^{de}	10.8	1414.9	86.4	46.7	21	12
11 ^{de}	5.9	20.6	96.2	69.0	61	48
12 ^{de}	8.0	29.4	122.2	84.1	40	15
13 ^f	9.4	13.0	106.5	42.8	55	24
14 ^f	6.1	32.8	73.1	123.5	64	40
15 ^{de}	21.5	22.0	128.1	132.6	39	15
average±SD	8.7±3.9	121.3±346.6	84.4±25.3	76.3±29.6	45.4±12.0	26.5±13.8
P values by paired t test (two-tailed)	0.24		0.42		<0.0000001	

*Normal values derived from Lee et al.⁷
TPP, thiamine pyrophosphate; FSS, the Fatigue Severity Scale; a, parenteral administration (the remaining patients were treated orally); b, blood test 2 days after the injection; c, blood test 2 h after the injection; d, fasting blood test in the morning; e, blood test 4 h after the intake of the first daily dose; n.v., normal value.

Costantini A, et al. BMJ Case Rep 2013

High-dose thiamine improves the symptoms of fibromyalgia

Patient's characteristics

Laboratory examinations, FSS, VNS	Patient 1	Patient 2	Patient 3
Thiamine before therapy (n.v. 2.1-4.3 µg/L)	10.2 µg/L	6.4 µg/L	9.6 µg/L
Thiamine after therapy	435.5 µg/L	107.0 µg/L	44.0 µg/L
TPP before therapy (n.v. >49 µg/L)	96.6 µg/L	106.1 µg/L	96.2 µg/L
TPP after therapy	184.3 µg/L	164.5 µg/L	126.5 µg/L
FSS before therapy	49	46	61
FSS after therapy	14	29	24
VNS before therapy	10	6	5
VNS after therapy	2	3	2

FSS, Fatigue Severity Scale; n.v., normal value; TPP, thiamine pyrophosphate; VNS, Visual Numeric Scale.

Costantini A, et al. BMJ Case Rep

B-complex

- Required for ATP production in glycolysis, TCA cycle and the electron transport chain
- Folic acid deficiency
 - subclinical or clinical macrocytic anemia & fatigue
- Riboflavin (B₂)
 - ↓ neuromuscular irritability (cramping/spasm) often accompanying CFS
 - helpful for fatigue as it is required for production of the FADH molecule and energy production
 - ↑ mitochondrial function by ↑ FADH production
- Vit B₅
 - required for adrenal hormone, metabolism of fatty acids, protein and CHO

Hoffman et al. Sports Medicine - Open (2017) 3:14
DOI 10.1186/s40798-017-0081-4

Sports Medicine - Open

A Placebo-Controlled Trial of Riboflavin for Enhancement of Ultramarathon Recovery

Martin D. Hoffman^{1,2*}, Taylor R. Valentino³, Kristin J. Stuenkel⁴ and Brandon V. Hassid⁵

Abstract

Background: Riboflavin is known to protect tissue from oxidative damage but, to our knowledge, has not been explored as a means to control exercise-related muscle soreness. This study investigated whether acute ingestion of riboflavin reduces muscle pain and soreness during and after completion of a 161-km ultramarathon and improves

Results: For the 32 (18 in the riboflavin group, 14 in the placebo group) race finishers completing the study, muscle pain and soreness ratings during and immediately after the race were found to be significantly lower ($p = .043$) for the riboflavin group. Analysis of the 400-m run times also showed significantly faster ($p < .05$) times for the riboflavin group than the placebo group at post-race days 3 and 5. Both groups showed that muscle pain and soreness had returned to pre-race levels by 5 days after the race and that 400-m run times had returned to pre-race performance levels by 10 days after the race.

Conclusions: This preliminary work suggests that riboflavin supplementation before and during prolonged running might reduce muscle pain and soreness during and at the completion of the exercise and may enhance early functional recovery after the exercise.

Keywords: Creatine kinase, Muscle fatigue, Muscle pain, Muscle soreness, Running

Mean 400-m run times for the 2 groups

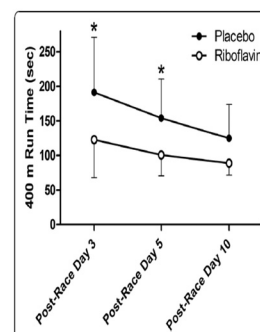


Fig. 2 Mean 400-m run times for the 2 groups. * $p < .05$ for post-testing group comparison. Error bars represent 1 SD and are shown only in 1 direction for clarity

Hoffman et al. Sports Medicine - (2017) 3:14

Therapeutic effects of oral NADH on the symptoms of patients with chronic fatigue syndrome

Linda M Foreyth, MD*, Harry G Preuss, MD†, Ann L MacDowell, MD*, Leonard Chazze, Jr, SCD‡, George D Berkman, MD, PhD§, and Joseph A Bellanti, MD*

Background: Chronic fatigue syndrome (CFS) is a disorder of unknown etiology, consisting of prolonged, debilitating fatigue, and a multitude of symptoms including neurocognitive dysfunction, flu-like symptoms, myalgia, weakness, arthralgia, low-grade fever, sore throat, headache, sleep disturbances, and swelling and tenderness of lymph nodes. No effective treatment for CFS is known.

Objective: The purpose of the study was to evaluate the efficacy of the reduced form of nicotinamide adenine dinucleotide (NADH) in ENADA® the stabilized oral absorbable form, in a randomized, double-blind, placebo-controlled crossover study in patients with CFS. Nicotinamide adenine dinucleotide is known to trigger energy production through ATP generation which may form the basis of its potential effects.

Methods: Twenty-six eligible patients who fulfilled the Center for Disease Control and Prevention criteria for CFS completed the study. Medical history, physical examination, laboratory studies, and questionnaires were obtained at

Results: No severe adverse effects were observed related to the study drug. Within this cohort of 26 patients, 8 of 26 (31%) responded favorably to NADH in contrast to 2 of 26 (8%) to placebo. Based upon these encouraging results we have decided to conduct an open-label study in a larger cohort of patients.

Conclusion: Collectively, the results of this pilot study indicate that NADH may be a valuable adjunctive therapy in the management of the chronic fatigue syndrome and suggest that further clinical trials be performed to establish its efficacy in this clinically perplexing disorder.

Ann Allergy Asthma Immunol 1999;82:185-191.

Effects of Pantothenic Acid Supplementation on Adrenal Steroid Secretion from Male Rats

Sukanya JAROENPORN,^{a,b} Tatsuya YAMAMOTO,^{a,b} Asuka ITABASHI,^b Katsuhiko NAKAMURA,^c Issao AZUMANO,^c Gen WATANABE,^{a,b} and Kazuyoshi TAJIMA^{a,b}

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The effects of pantothenic acid-supplementation on the adrenal secretion of corticosterone and progesterone in male rats were investigated using an *in vitro* cell culture system. Male rats at 21 d of age were given 0.03% pantothenic acid in their drinking water for 9 weeks. After 9 weeks of treatment, the animals were decapitated, and adrenal cells were cultured in the absence or presence of rat adrenocorticotrophic hormone (ACTH; 10^{-15} to 10^{-18} M) and/or ovine prolactin (oPRL; 10^{-7} to 10^{-10} M) for 4 h. Adrenal cells in pantothenic acid-treated rats exhibited higher basal levels of corticosterone and progesterone than control rats. The response of ACTH and/or PRL on corticosterone and progesterone release was higher in the pantothenic acid-treated rats than in the control rats. In addition, PRL increased the stimulatory effect of ACTH-induced corticosterone secretion in both normal and pantothenic acid-treated rats. These results clearly demonstrated that pantothenic acid supplementation stimulates the ability of adrenal cells in male rats to secrete corticosterone and progesterone. Additionally, these results also showed that pantothenic acid supplementation induced adrenal hyperresponsiveness to ACTH stimulation, and PRL further stimulated adrenal sensitivity to ACTH.

Key words: adrenal gland; corticosterone; pantothenic acid; rat

Biol Pharm Bull. 2008 Jun;31(6):1205-8.

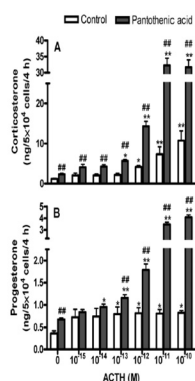


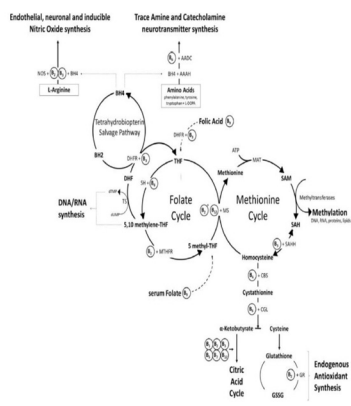
Fig. 1. Effects of ACTH (10^{-15} to 10^{-10} M) on Release of Corticosterone (A) and Progesterone (B) in Primary Adrenal Cultured Cells from Adult Male Rats Treated with 0 (control) or 0.03% Pantothenic Acid

Biol Pharm Bull. 2008 Jun;31(6):1205-8.

Vit B₆

- Coenzyme for Mg and synergist of Mg
- Required coenzyme for hundreds of metabolic reactions
- Improve tingling, pain, weakness & numbness

The interlinked folate and methionine cycles



Vit B12

- In Fatigue pts,
 - impaired transport of vit B₁₂ across the BBB,
 - accelerated breakdown of vit B₁₂ in the brain
- Recommended I.M in the morning d/t excitatory effect of vit B₁₂

CFIDS Chronicle 1997(Winter):57

CFIDS Chronicle 1999(Nov/Dec):14-16

Magnesium

- Major role in reactions involving ATP, DNA & RNA
- Many enzymes (over 400) require Mg
- Required for the shuttling of potassium intracellularly
- Often deficient in fibromyalgia – 45%
 - low at sites of tenderness in pts with fibromyalgia
- In balance with Ca - between 2:1 and 1:2
 - good to reduce intracellular Ca & abnormal calcification

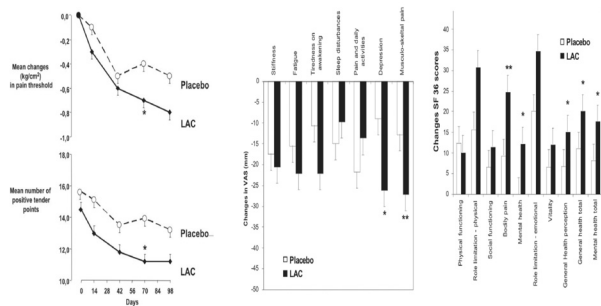
Arthritis Rheum 1994;37:790-793

Magnesium Status in Patients with Chronic Fatigue

- Chronic fatigue lasting for at least one month
- 20% retention was taken as the cut-off value to diagnose a deficiency in body Mg stores
- 47% of the cases were classified as being Mg deficient

Journal of the American College of Nutrition, Vol. 19, No. 3, 374-382 (2000)

Double-blind, multicenter trial comparing acetyl L-carnitine with placebo in the treatment of fibromyalgia patients



- 2 capsules/day of 500 mg LAC or placebo plus one intramuscular (i.m.) injection of either 500 mg LAC or placebo for 2 weeks.
- During the following 8 weeks the patients took 3 capsules daily containing either 500 mg LAC or placebo

Clin Exp Rheumatol. 2007 Mar-Apr;25(2):182-8.

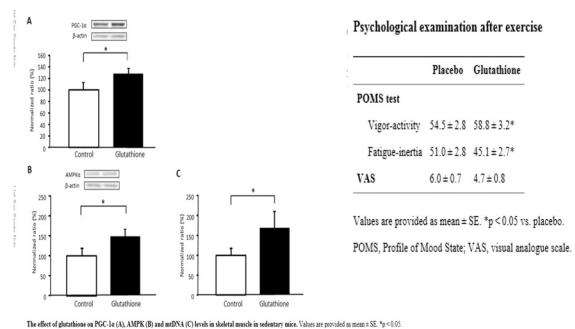
Glutathione

- Synthesized from amino acids
 - L-cysteine, L-glutamate, and glycine
- Sulfhydryl group of cysteine is a proton donor and is responsible for its biological activity
- Protects cells from ROS, free radicals and peroxides

Glutathione for fatigue

- Major endogenous antioxidant produced by cells.
- Maintains reduced state of other antioxidants
 - Vitamin C & E
- Detoxifies many xenobiotics
- Maintains numerous metabolic and biochemical reactions
 - DNA synthesis and repair
 - Protein synthesis
 - Prostaglandin synthesis
 - Amino acid transport
 - Enzyme activation

The effect of glutathione on PGC-1α (A), AMPK (B) and mtDNA (C) levels in skeletal muscle in sedentary mice



J Int Soc Sports Nutr. 2015; 12: 7.

Glycyrrhizic acid

- Component of licorice root
- Reduce AST, ALT in serum
- Inhibits immune-mediated cytotoxicity against hepatocytes and NF-kappa B
- **powerful antiviral effects** particularly against hepatitis C
- Lower estrogen, raise progesterone
- **aldosterone-like effects**
 - Licorice root >3g/d or glycyrrhizin acid >100mg/d, >6 weeks
 - Na and water retention, HTN, hypokalemia, renin-aldosterone inhibition
 - BP, electrolyte monitoring
 - Recommend potassium intake

Glycyrrhizic acid

- **Supports the adrenal gland**
- **↑ cortisol availability**

Arzneimittelforschung 1979;29(4):647-649
Clin Sci(CoCh)2002;102:203-211

- Effects of glucocorticoids & mineralocorticoids by slowing the rate of their catabolism

Endocrinol Jpn 1990;37:331-341
Arzneimittelforschung 1979;29(4):647-649
J Clin Endocrinol Metab 1956;16:338-349
Endocrinol Jpn 1957;4:17-27

Adrenal Function(만성스트레스로 인한 피로) 과 관련된 IVNT

- Glycyrrhizic acid
- Pantothenic acid
- Vitamin C
- Magnesium

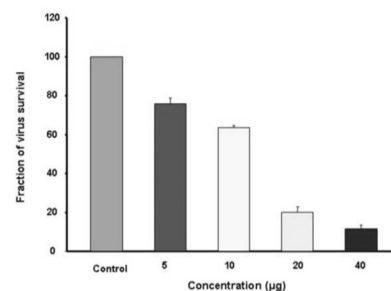
만성피로에서 IVNT cycle

- 치료의 원인 및 환자의 상태에 따라서
- 부신피로, Muscle cramps, fibromyalgia ;
 - 심한 경우 weekly 2달 → every other weekly 2달 → monthly 2달
 - 중등도 every other weekly → monthly
- 2주 1회 부터는 경구용 제제 복용
- 2-4개월에 필요하면 Mg, Vit D, Cortisol, DHEA-S 검사
- 6개월에 Mg, Vit D, Cortisol, DHEA-S, 모발미네랄 검사 등 진행하여 증상 및 검사 소견 비교하여 치료 중단 및 지속 여부 결정

바이러스 질환에 도움이 되는 IVNT

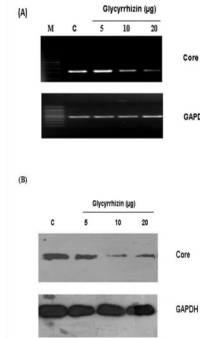
- Antiviral activity 과 Adrenal gland function
 - Vitamin C
 - Glycyrrhizic acid
 - Pantothenic acid
 - Magnesium
- Antiviral effect of vitamin C;
 - 10-15 mg/dL
 - level achievable with IV but not oral therapy
- 도움이 되는 대표적인 Antiviral Diseases
 - Herpes zoster
 - Facial palsy
 - Common Cold
 - Influenza

Dose dependent inhibition of GL against HCV 3a genotype



Journal of Translational Medicine 2011
9:112

Dose dependent inhibition of GL against HCV core gene



Journal of Translational Medicine 2011
9:112

IVNT 주기 및 경과

- 대상 질환 및 조건에 따라 상이
- 부신피로, Muscle cramps, fibromyalgia ;
 - 심한 경우 weekly 2달 → every other weekly 2달 → monthly 2달
 - 중등도 every other weekly → monthly
- 바이러스성 질환(급성 질환)
 - 심한 경우 every other day 혹은 주당 2-4회 정도
 - 단순포진, 독감, A형 간염 등의 경우 1 주 정도 유지
 - 대상포진은 2주 이상,
 - Bell's palsy 의 경우 1달 정도
- 심한 두드러기; weekly 3주 --- 4 주 정도

결론

- 혈관영양주사(IVNT)는 정통의학에서 잘 해결되지 않는 기능이상에 도움이 되는 치료
- 적절하게 적용시 임상적으로 효과가 확실하다.
- 각각의 증상이나 질환에 따라 적용간격, 추적기간, 유지 요법 등의 이해가 필요하다.