Glrp_tclmsq &Kgapm'lsrpgclr Rfcp_nw

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Intravenous Nutritional Therapy

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

Case

- 40세 여자 피로를 주소를 내원
- 2년 전부터 잠을 자고 나도 개운하지 않고 오후 내내 지속되어 집안 일을 제대로 못할 정도
- 아침에 자녀 등교시 아침 식사 준비를 못할 정도
- 설거지 정도의 가사일 이후에도 쉬어야 함
- 전신 근육통이 동반
- 2년전 부터 일반적인 혈액검사: 간기능, 갑상선 기능검사, 빈혈, 혈당, 전해질, 류마티스 인자, ESR 등 검사상 특이 소견 없음
- 위, 장내시경, 복부 초음파 등 특이소견 없음
- 우울증 진단하에 SSRI 복용: 호전 없었음

Case

- Chronic fatigue syndrome 에 합당한가?
- 어떻게 할 것인가? 기능의학적 접근이 도움이 될 것인가?
  - Hormonal (Cortisol, DHEA-s)
  - Tissue mineral analysis
  - Urine organic acid 분석 등
- IVNT(intravenous micronutritional therapy) 가 도움이 될 것인가?

History and IVNT (History of Myers' Cocktail)

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-
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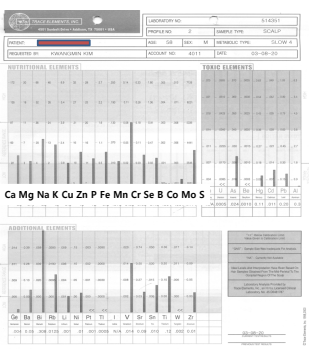
TMA(Tissue Mineral Analysis)

- 미네랄 결핍 및 과잉은 혈액 검사나 소변 검사에서 보다 조직 미네랄 검사(TMA)에서 쉽게 관찰
- 모발이 가장 적절:
  모근에서 혈액의 미네랄 정보를 받아, 다시 혈액에 반작용을 하지 않고 하루에 0.3㎜씩 자람
  3㎝의 모발: 약 100일치의 미네랄에 대한 평균 값
  질환이나 질환으로 이행하는 과정의 상태를 파악
- 중금속의 체내 함유

해석 방법

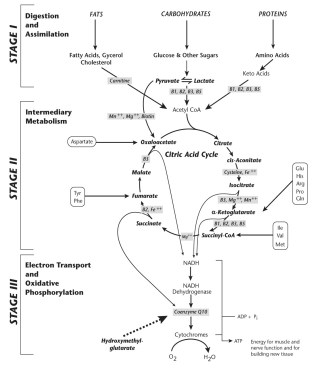


- 모든 미네랄의 수치(LEVEL)은 mg% 따라서 (x 10 = ppm)
- 영양미네랄 및 미량 미네랄
  ; 흰 부분이 정상범위
  정상범위 보다 높으면 HIGH
  낮으면 LOW
- 독성 중금속은 허용범위는 흰 부분
  많이 축적될 수록 붉은 색
- TMA는 인정 비급여
  (심평원 공문, 수가083.1-13
  ; 2003년 1월 6일)
- 미국에서 인가된 검사 기관
  : CLIA 88, 45D0481787

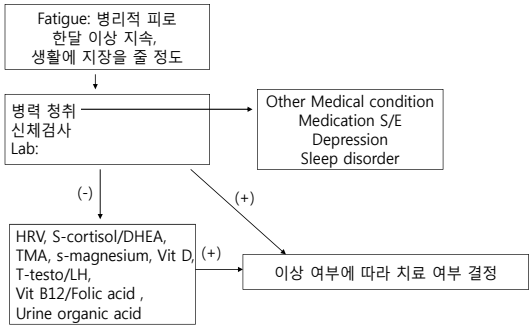
피로 환자;
Kreb's cycle 대사물로 기능 분석

- Elevated levels of metabolic intermediates indicate a biochemical block just downstream of the elevated metabolite
- Blocks can be caused by
  - functional deficiencies of nutrient cofactors
  - inhibitors of enzymes(toxins, heavy metals)

소변 유기산 검사



Fatigue algorithm



IVNT 주의사항

- 정상 혈액 275-308
- 비타민 는 빠르게 소변으로 배설되어 선호
- 및 아미노산 제제는 비타민 와 분리하여 정주

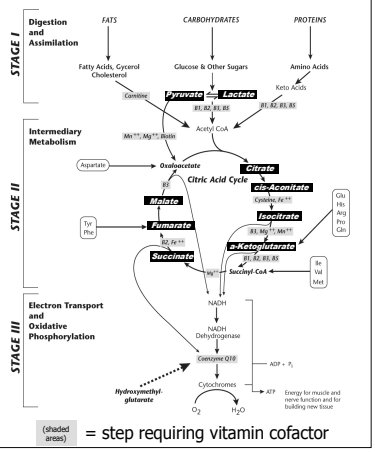
사용하는 IV 제제

- Kyominotin 2 ample
  Glycyrrhizinate 53㎎
  Glycine 400㎎
  Cysteine 15.37㎎
- Magnesium
  Mg 2000 mg
- Beecom hexa 1 ample
  Nicotinamide 40mg
  B1 10mg
  B12 10μg
  B2 5.47mg
  B6 5mg
  Dexpanthenol 5.17mg
- Dutenol
  Dexpanthenol 500mg
- Thiamine
  Thiamine 50mg
- Bidoxin
  Pyridoxin 50mg
- Mega-C
  Vit C 10g
- Bivon
  8 cc $NaHCO_3$
- Glutathione
- Selenium
- Lipoic acid
- B12 1000ug

IVNT

• MgCl	10 cc(2.0g)
• Pantothenic acid (B5)	2 cc (500mg)
• Pyridoxine(B6)	1 cc (50mg)
• Vitamin C	20 cc(10g)
• Bivon	8 cc
• B-complex	1 ample
• B1	50 mg
• *Reduced Glutathione*	*10 cc(600mg): IV*
• *Glycyrrhizic acid*	*2 ample*
• *Selenium*	*0.5 ample*
• *Amino Acid*	

Stages of Energy Production From Food



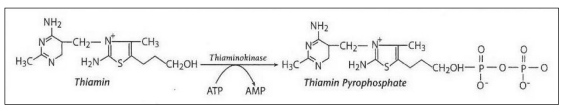
(shaded areas) = step requiring vitamin cofactor

Vitamin C

- ↓
- ↓
-
-

Vitamin B_1(Thiamin)

- Physiologic function; Energy production, nucleic acid synthesis; **require Mg !**

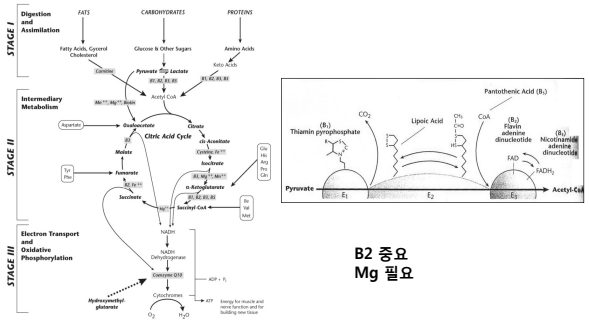


Conversion of Thiamin to Thiamin Pyrophosphate; active form- primary coenzymatic form

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 (B_2)
  – **↓ 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 B_5
  – **required for adrenal hormone**, metabolism of fatty acids, protein and CHO

Muscle cramp(쥐가 나는 경우)



B2 중요
Mg 필요

Muscle cramp 시 IVNT

- 5% D/W 200ml
- B comp 4 ample
- MgCl 10 cc(2.0g)
- Thiamine 50 mg

Vit B_6

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

Vit B12

- In Fatigue pts,
  - impaired transport of vit B_{12} across the BBB,
  - accelerated breakdown of vit B_{12} in the brain

CFIDS Chronicle 1997(Winter):57

- Recommended I.M in the morning d/t excitatory effect of vit B_{12}

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

Vit B12

- Cyanocobalamine: poisoning 문제로 잘 사용되지 않음
- Hydroxocobalamine: bioavailability 가 매우 높음
- Methylcobalamine: Methylation 에 사용됨

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

- Highly concentrated in the adrenal gland
- Required in the TCA cycle as Mg for energy production
- Sx of CFS are quite similar to Mg deficiency
  - IV Mg → rapid resolution of chronic muscle pain
- Helps regulate blood sugar balance

Magnes Trace Elem 1990;9:333

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

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

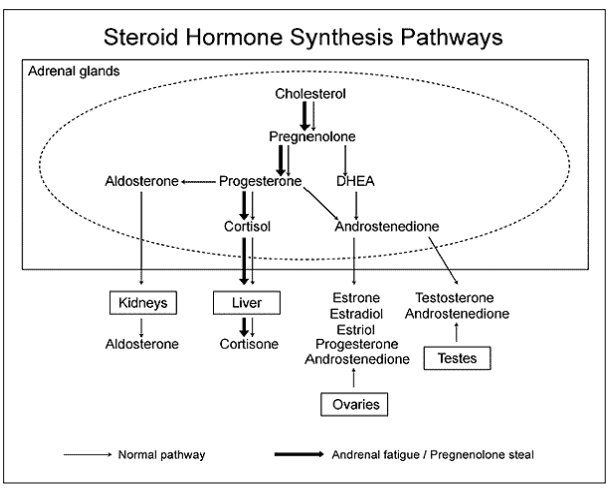
Glycyrrhizic acid

- Supports the adrenal gland
- ↑ cortisol availability

Arzneimittelforschung 1979;2994):647-649
Clin Sci(Colch)2002;102:203-211

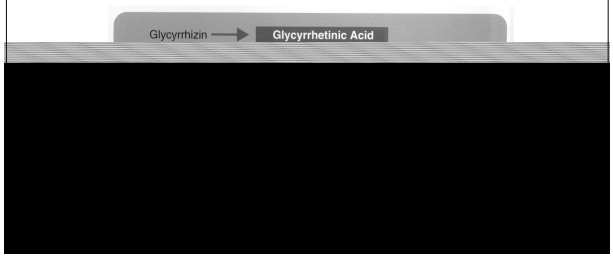
- Effects of glucocorticoids & mineralocorticoids by slowing the rate of their catabolism

Endocrinol Jpn 1990;37:331-341
Arzneimittelforschung 1979;2994):647-649
J Clin Endocrinol Metab 1956;16:338-349
Endocrinol Jpn 1957;4:17-27

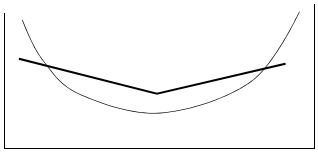


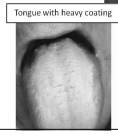
Glycyrrhizic acid

- Inhibit dehydrogenation of cortisol
- Prolong the life of progesterone, exert a weak amphoteric estrogenic action and improve general gonadotropic rhythms in body



- **TMA Na/Mg < 4.0:1**
- ,
- : arousal
- ( )
- 7-8





Adrenal Function 과 관련된 IVNT

- Glycyrrhizic acid
- Pantothenic acid
- Vitamin C
- Magnesium

Amino Acids (8.5%)

- Subnormal 24-hour urinary excretion in CFS pts
  - methionine, phenylalanine, isoleucine, lysine, tryptophan, valine, leucine

J Nutr Med 1991;2:369-375

- Significant clinical improvement after 3 months in 15 of 25 pts with CFS

J Appl Nutr 1994;46(3):74-78

Amino Acids (8.5%)

- Required for detoxification, immune function
- Tyrosine
  - required for the synthesis of thyroid hormone
  - enhance dopamine, catecholamine synthesis
  - improve stress-associated declines in noradrenaline and performance
- Phenylalanine
  - Precursor to tyrosine, depamine, L-dopa, NE, epi
  - All required for a proper stress response

Important Amino Acids for fatigue

- BCAA's; essential to all biologic functions
- Glutamine; Needed for Muscle, GUT health
- Tryptophan; Precursor to serotonin
- Arginine; promotes healthy NO and IGF-1 levels.
  vasodilatory and antihypertensive effects in IV.

바이러스 질환에 도움이 되는 IVNT

- Antiviral activity 과 Adrenal gland function
  - Vitmain C
  - Glycyrrhizic acid
  - Pantothenic acid
  - Magnesium
- Antiviral Diseases
  - Herpes zoster
  - Facial palsy
  - Common Cold
  - Influenza

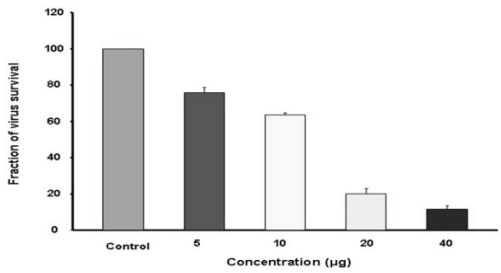
Vitamin C

- Antiviral effect of vitamin C;
  - 10-15 mg/dL
  - level achievable with IV but not oral therapy

Pharmacological activities of Glycyrrhizic acid

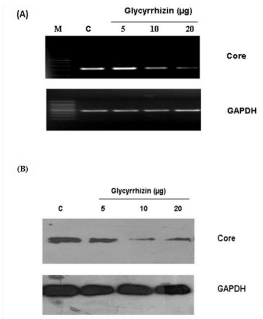
- Antioxidative, anti-inflammatory, antiulcerous, antidotal, antiallergic, antiviral, immunomodulating, hepatoprotective, and cardioprotective properties

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 cycle

- 치료의 원인 및 환자의 상태에 따라서...
- 일반적으로 1회/1 week --- 2달
  1회/2 week --- 2달
  1회/1 month --- 2달
- 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

IVNT

- MgCl 10 cc(2.0g)
- Pantothenic acid (B5) 2 cc (500mg)
- Pyridoxine(B6) 1 cc (50mg)
- Vitamin C 20 cc(10g)
- Bivon 8 cc
- B-complex 1 ample
- B1 50 mg

- *Reduced Glutathione* *10 cc(600mg): IV*
- *Glycyrrhizic acid* *2 ample*
- *Selenium* *0.5 ample*
- *Amino Acid*
- *Placenta Extract*

Summary

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