The Awesome Foursome
‘Metabolic Cardiology’
Ben Brown MD January 2013
Special thanks to Steven Sinatra MD
(God Father of Metabolic Cardiology)

Goals and Objectives
• What are “The Awesome Foursome”?  
• What do they do?  
• Show me the data...  
• Dosing and indications (handout)

IM4Us Treatment Pyramid

Environment

Patient Centered Goals

Internal Environment

Life Style

Natural Therapies

Conventional Medicine

Cases
• Bert: 72y 3 strokes, htn, hyprTG, DM, CHF (EF30%) and sits in a chair all day. Hates meds and they all have side effects. Rarely comes in unless it is serious or ill make him.  
• Jim 56y LAD MI coded cathed and in ICU, EF 38% post stent, dopamine drip, hypothermia protocol, aortic balloon pump. Otherwise healthy.

Pop Quiz
Are there supplements that can:
1. Increase the time to ST depression 8 times in someone with exercise induced ischemia?  
2. Cut angina, arrhythmia’s, LV dysfunction, and death in half after an MI?  
3. Potentially decrease risk of death after MI by 10 times?

The Awesome Foursome
• Magnesium  
• CoQ10  
• L-Carnitine  
• D-Ribose
What do the other 3 do?

General: they help with ATP production
- Why is ATP production important in a compromised heart?
- Ischemia and poor baseline nutrition as major players in ATP depletion.

Some of the Data

CoQ10, L-Carnitine, D-Ribose
Pop Quiz

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L-carnitine and Diet

- Found in muscle
  - Sheep
  - Lamb
  - Cattle
  - Pig
- Very low in grains, cereals, fruits, and vegetables
- Like Coenzyme Q10, low in vegetarians

L-carnitine and Angina

- 200 patients, 40 to 65, exercise-induced angina
- Usual drug Rx and 2 gms of L-carnitine or placebo
- Verum group - Significant reduction in ventricular ectopics, improved exercise tolerance, reduced ST segment response on exercise.


L-carnitine and Heart Attack

Controlled study of 160 patients with MI

- 80 received 4 gms of L-carnitine for 12 months
- 80 received placebo
- All on conventional Rx

* Mortality 1.2% on carnitine supplementation
  12.5% controls


D-ribose

- Loss of purines in ischemic situation
- Slow process to replace adenine pool
- D-ribose used by cell to manage cellular energy restoration
- If D-ribose not available energy pool cannot be restored
- Human heart – it may take up to 100 days to restore ATP via de novo synthesis

Rate limiting step in salvage and synthesis of ATP is availability of D-ribose

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Ribose in Congestive Heart Failure

- 15 subjects; (NYHA II or III) ischemic cardiomyopathy
  - 2/3 with 3V Dz; mean ejection fraction 47% (range 28% - 71%)
- Randomized to receive over 3 weeks
  - Ribose; 5 gm tid
  - Placebo (dextrose); 5 gm tid
- Pre- and post-treatment measure
  - ECHO measures of diastolic and systolic function
  - Physical performance (exercise tolerance)
  - Quality of life (SF-36 score)
- Cross over to alternative treatment after one week washout period
- Double blind protocol followed

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Metabolic Cardiology

- Old and New Science with some very promising evidence
- Who are you as a clinician
  - innovator (cowboy/girl), early adopter, middle, late, traditionalist-laggard-resister
- My take: some real truth here-
  - $20-40/mo and a supplement, not for all patients, but
  - low SE and some real benefits, especially in high risk patients.
Cases

- Bert: 72y 3 strokes, htn, hyprTG, DM, CHF (EF30%) and sits in a chair all day. Hates meds and they all have side effects. Rarely comes in unless it is serious or ill make him.
- Jim 56y LAD MI coded cathed and in ICU. EF 38% post stent, dopamine c protocol, aortic balloon pump, healthy.

Questions?

- Would you try it on a relative?
- Would you use it on yourself?
- Would you use it on a patient?
- Your questions?

- Magnesium therapy in acute myocardial infarction when patients are not candidates for thrombolytic therapy: Schmitter M, Holl H, Chouraqui P, Kapinsky E, Kalinowits B. Heart Institute, Sheba Medical Center, Tel-Hashomer, Israel. Am J Cardiol 1995 Feb 15;75(4):321-325. Thrombolytic therapy reduces in-hospital mortality. However, 70% to 80% of patients do not receive thrombolysis and their in-hospital mortality is high. During the last decade some clinical trials demonstrated that magnesium sulfate reduced in-hospital mortality. The aim of this study was to evaluate the effects of magnesium sulfate in patients with acute myocardial infarction (AMI) who were considered unsuitable for thrombolytic therapy. Intravenous magnesium sulfate was evaluated in 294 patients with AMI ineligible for thrombolytic therapy in a randomized, double-blind, placebo-controlled study. Group I consisted of the patients who received 48-hour intravenous magnesium. Group II consisted of the patients who received isotonic glucose as a placebo. Magnesium reduced the incidence of arrhythmias, congestive heart failure, and conduction disturbances compared with placebo (27% vs 40%, p = 0.04; 18% vs 23%, p = 0.27; 10% vs 15%, p = 0.31, respectively). The intraventricular ejection fraction 7 days and 6 to 8 months after admission was higher in patients who received magnesium than in those taking placebo (18% vs 43% and 33% vs 46%, p = 0.01, respectively). In-hospital mortality was significantly reduced in patients receiving magnesium sulfate than in those receiving placebo (14% vs 17%, p = 0.10), and also in the subgroup of elderly patients (> 70 years) (14% vs 21%, p = 0.39). In conclusion, magnesium sulfate should be considered as an alternative therapy to thrombolytic therapy in patients with AMI.

Dosing: see Handout

- Sources: Vitacost.com, lef.org, others
- Magnesium (generally citrate, but appears all will work)
- L Carnitine or acetyl L carnitine (both work)
- CoQ 10 ubiquinol or ubiquinone (‘nol is better then ‘none-more absorbed, but more$')
A Randomized, Double-Blind, Placebo-Controlled Trial of L-carnitine in Suspected Acute Myocardial Infarction

100 Patients - Suspected MI

Verum - 2 gms L-carnitine - 28 days

Death rate: 15.6% carnitine group vs. 26% placebo


Documented Benefits of D-ribose

- Improves treadmill findings in patients with CAD
- Better diastolic function, QOL, and functional status in CHF
- Accelerates recovery of systolic function post CABG
- Speeds recovery of muscle ATP following anaerobic exercise
- Enhances strength and endurance gain with weight training
- Decreases free radical stress during anaerobic exercise
- Benefit in fibromyalgia