Update in Cardiac rehabilitation

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Disclosures

• None
Case Presentation

• 45 year old male, in for office visit
• Father had myocardial infarction at 52
• Brings list of things that he has heard will help him keep his heart healthy
• Are they fact or fiction?
• Lower fat diets lower CVD risk best?
• Chocolate lowers CVD risk?
• Eggs raise CVD risk?
• Coconut oil/milk lowers CVD risk?
• Walking /Running has the same benefit?
• “Talk Test” is accurate to guide exercise intensity?
• Slow / Rapid weight loss is better?
• Chelation therapy reduces CVD risk?
What is the truth?
Where does that truth come from?
Examine Level of Evidence!

• Type and Level of Evidence:
  • Randomized, controlled studies
  • Non-randomized, controlled studies
  • Observational studies
  • Case reports
  • Opinion
Update in CR -- Nutrition
Question 1: Nutrition

Which of the following has been shown in randomized, controlled trials to lower mortality rates in patients with CAD?

A. Very low fat diet
B. Mediterranean diet
C. High protein diet
D. All of the above
E. None of the above
Lower fat diets lower CVD risk best?
<table>
<thead>
<tr>
<th>Dietary Plan</th>
<th>Total Fat (% cals)</th>
<th>Sat Fat (% cals)</th>
<th>Protein (% cals)</th>
<th>Carb (% cals)</th>
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<td>15%</td>
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<td>10%</td>
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<tr>
<td>High Protein</td>
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<td>Lipid Rx</td>
<td>CVD Mortality</td>
<td>Total Mortality</td>
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<tr>
<td>------------------</td>
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<td>TG/HDL</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Mediterranean</td>
<td>Yes</td>
<td>All</td>
<td>Decrease</td>
<td>Decrease</td>
</tr>
</tbody>
</table>
• PREDIMED Study
  • 7447 people, high CVD risk
  • Randomized to 3 groups
    • Med Diet + Olive Oil
    • Med Diet + Nuts
    • Control Diet
  • Early termination
  • 30% reduction in CVD events (MI, stroke, CVD death)
Lyon Heart Study

- 423 patients randomized post-MI 1988-92
- Mediterranean diet vs “prudent diet” prescribed by patients’ physicians
- Planned 5-year follow-up
- Study terminated early (4 years) due to favorable interim analysis

Lyon Heart Study

Primary endpoints
• Cardiac death, nonfatal MI

Secondary endpoints
• Peri-procedural MI, unstable angina, CHF, stroke, pulmonary or peripheral embolism

Tertiary endpoints
• Stable angina, elective revascularization, post-PTCA restenosis, thrombophlebitis
Lyon Heart Study

de Lorgeril et al, Circ 1999;99:779-785
Mediterranean Diet and Survival

Cumulative Survival Without Nonfatal Cancer and Nonfatal Recurrent Acute MI

Without event (%)

Year

P<0.001

Mediterranean Diet

- Low in saturated and polyunsaturated fats
- Low in cholesterol
- High in monounsaturated fats (olive oil)
- Moderately high in fiber
- Fish primary protein source
- Low in beef and pork
- Lots of fresh fruits and vegetables, pasta
Question 1: Nutrition

Which of the following has been shown in randomized, controlled trials to lower mortality rates in patients with CAD?

A. Very low fat diet
B. Mediterranean diet
C. High protein diet
D. All of the above
E. None of the above
Lower fat diets lower CVD risk best?

We don’t know!

Low saturated fat intake is the key dietary step in CVD prevention
Lower fat diets lower CVD risk best?

We don’t know!

Mediterranean Dietary Pattern Has Strongest Evidence (RCT)
Question 2: Chocolate lowers CVD risk?
• Chocolate lowers CVD risk
  • Probably yes!
  • RCT of chocolate, cocoa
  • Improvements in:
    • Dose independent
      • Insulin sensitivity, Endothelial function
    • Dose dependent (>50 mg epicatechin/day)
      • Diastolic BP, MAP, LDL, HDL
    • Observational, and modeling studies
      • Reduction in CVD events
Question 3: Eggs raise CVD risk?
BMJ 2013;346:e8539

• Eggs raise CVD risk
  • **Probably no!**
    • Lower dose
  • **Probably yes!**
    • Higher dose and in DM
  • Meta-analysis, cohort studies
  • One egg per day or less
    • No increase in MI, Stroke
  • More than one egg/day, and in DM patients
    • Increased risk of MI, Stroke
Question 4: Coconut oil/milk lowers CVD risk?
Coconut oil/milk lowers CVD risk?

• **Probably no!**

• Coconut oil/milk is high in saturated fat

• Increases total cholesterol levels
  • *Arch Int Med* 1958;102:173-8 (small RCT)

• Increases HDL?, reduces waist circumference?
  • *Lipids* 2009;44:593-601 (small RCT)

• Current American Dietetic Association Guidelines
  • Limit saturated fats
  • *J Am Diet Assoc* 2007;107:1599-1611
Update in CR -- Exercise
Exercise

What is MANLY STRENGTH?
What Is Snap and Vim?
What Is Nerve Force?
What Is Business Push?
What Is Strength and Energy?
What Is Health and Vigor?

In fact, what is Life itself but ELECTRICITY? Does not all living authority tell us that they are so closely allied that none can say where one leaves off and the other begins? Who can dispute that they are not the same? The Strong, healthy Man is ALWAYS FULL OF ELECTRICITY, and the weakening is ALWAYS LACKING IT. What is more natural then, than that Electricity should cure whenever nerve strength and life are needed, as in Debility, Exhaustion, etc.? There is no question about it, for it is a fact that it does, as I have demonstrated by curing nearly 100,000 men in my 30 years of ceaseless labor in this field. The whole secret is simply to give the treatment right, and my success answers that, as can be judged by going over any of the prominent papers in the United States for the past 30 years, or call and see the evidence in my hands. Has there ever been such another record? I have perfected a great improvement in the DR. SANDEN ELECTRIC BELT, which is now, and always has been, the best. My new appliance is the HERCULEX BODY BATTERY with suspensory attachment. Simply wear it at night, remove on rising, and while you sleep an easy, soothing current of NEW LIFE is applied directly to the centres of nervous strength. Keep this up for 60 or 90 days and you will again have your NEW STRENGTH, your NATIVE VITALITY—because you will have supplied the nervous energy which has been wasted. If you are passing this office, call in and consult me. I am cheerfully willing to talk over your case—it will cost you nothing; or, if not convenient to call, I will personally answer your letter. Ask me to send my new illustrated book for men, called "Health in Nature," sent free by mail, in plain, sealed envelope.

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Question 5:

- Walking / Running has the same benefit?
Walking = Running:

- **Caloric expenditure**
  - Walk one mile = Run one mile?

- **Reducing CVD risk factors**
  - Walking = Running?
Caloric Expenditure

Walking one mile burns as many calories as running one mile?

- Walking one mile burns 334-340 kcal
- Running one mile burns 480-481 kcal

CVD Risk Factor Reduction

Walking = Running?

- 33,060 from National Runners Survey
- 15,945 from National Walkers Survey
- Walkers older than runners, more likely to be female
- 6.2 year follow-up
- Incident HTN, Hypercholesterolemia, DM

Arterioscler Thromb Vasc Biol 2013:33:1088-93
Walking versus Running:
% Reduction per MET h/d

* p = 0.06

Arterioscler Thromb Vasc Biol 2013:33:1088-93
Question 6: "Talk Test" is accurate to guide exercise intensity?
“Talk Test” is accurate to guide exercise intensity?

- Yes!

- “Talk Test” = Exercise to the point of you are short of breath but can still speak in short sentences between breaths

- Similar to recommended HR or RPE range

**J Strength Cond Res 2011:25:590-6.**
Update in CR -- Obesity
Question 7:

Large, rapid weight loss is associated with poorer long-term weight outcomes than is slow, gradual weight loss?
Question 7:

- Large, rapid weight loss is associated with poorer long-term weight outcomes than is slow, gradual weight loss?  

- Studies suggest rapid weight loss is associated with either similar or better long-term weight loss than slow weight loss
  

Myth!

NEJM 2013;368:446-454
Question 8: Toning pants work?
Toning pants work?

“Like burning the equivalent of half a peanut M&M….
(J. Porcari, principal investigator)
Question 9: Chelation therapy reduces CVD risk?
PATCH Trial

- 84 patients
- >21 years old
- Known CAD, ischemia on ETT
- Randomized Trial
  - Chelation vs Placebo
    - Infusions twice weekly x 15, then monthly x 3
    - EDTA
    - Multivitamin for both groups
- Primary outcome measure:
  - Change from baseline to 27-week follow-up
  - Time to ischemia

No significant difference in primary outcome
TACT Trial

- 1708 patients
- >50 years old
- Previous MI >6 wks before
- 2x2 factorial design
  - Chelation vs Placebo
    - 40 infusions, weekly x 30, every 2-8 wks x 10
    - EDTA, ascorbate, B vitamins, electrolytes, procaine, heparin
  - Vitamin vs Placebo
- Composite endpoint:
  - Mortality, recurrent MI, stroke, coronary revascularization, or hospitalization for angina
TACT Trial

Event Rate, Proportion of Total

Follow-up, mo

Placebo
EDTA chelation

HR, 0.82; 95% CI, 0.69-0.99
Log-rank $P = .035$

No. at risk
EDTA chelation
839 760 703 650 588 537 511 476 427 358 229
Placebo
869 776 701 638 566 515 475 429 384 322 205

TACT Trial

TACT Trial

• Concerns about reliability of study
  • 60% of patients enrolled in Alternative Health Centers
  • 18% lost to follow-up
    • More in placebo group
    • More in Alternative Health Centers
    • Suggests unmasking at Alternative Health Centers
  • Sponsors (NHLBI) were unblinded
  • Majority of endpoints were “soft” (318/483)
    • Revascularization, angina
  • Due to slow enrollment, design was changed

doi:10.1001/jama.2013.2778
Chelation therapy reduces CVD risk?

We don’t know!

Latest RCT suggests possible benefit secondary prevention, but there are significant limitations to the study.
Question 10: Exercise Training

Randomized, controlled trials of which of the following treatments have been shown to reduce mortality in CAD patients?

A. Exercise Training
B. Smoking Cessation
C. Both A and B
D. None of the above
Exercise is Strong Medicine

Change in hsCRP in PCI and Exercise Training Groups

- 101 Men, Germany
- Stable CAD
- Randomized to
  - Percutaneous Coronary Intervention
  - Exercise Therapy
    - 70% maximum HR
    - 20 min/day plus one 60 min session/wk
- 24 month follow-up
- Outcomes
  - Inflammatory markers
  - Recurrent CAD events

Exercise is Strong Medicine

24 month event-free survival: PCI and Ex Training Groups

Smoking Cessation and Secondary CAD Prevention

• At time of CVD event
  • 40% are current smokers at time of CV event
  • 50% quit smoking after event
  • 20% continue to smoke, have 60% increase in mortality

• Among those who quit
  • 36% reduction in total mortality
  • 32% reduction in recurrent CV events

Am J Cardiol. 2013 Jan 15;107(2):145-50
Eur Heart J. 2006 Jan;27(1):35-41
Circulation 2012;125:e2-e220
Question 10: Exercise Training

Randomized, controlled trials of which of the following treatments have been shown to reduce mortality in CAD patients?

A. Exercise Training
B. Smoking Cessation
C. Both A and B
D. None of the above
Question 11: Preventive Medications

Randomized, controlled trials of which of the following treatments have been shown to reduce morbidity and mortality in CAD patients?

A. Aspirin
B. Statin therapy
C. Fish oil
D. B and C
E. A and B
Aspirin and Secondary CAD Prevention

• Meta-analysis of secondary prevention trials
• 20% reduction in cardiac events
• Non-significant increase in hemorrhagic stroke

4S Study

Total Mortality

Coronary Death and Non-fatal MI

The Scandinavian Simvastatin Survival Study - Lancet 344, 1994
Fish Oil and Secondary CAD Prevention

• Meta-analysis of randomized trials
• No significant impact on total mortality, CVD events, heart failure, TIA/stroke
• No difference by dosage

Arch Intern Med. 2012 May 14;172(9):686-94
Question 11: Preventive Medications

Randomized, controlled trials of which of the following treatments have been shown to reduce morbidity and mortality in CAD patients?

A. Aspirin
B. Statin therapy
C. Fish oil
D. B and C
E. A and B
Question 12:
Which of the following is an AHA/ACCF class IA recommendation for secondary CAD prevention?
A. Statin therapy
B. Cardiac rehabilitation
C. Weight loss, in patients with obesity
D. A and B
E. A and C

ACCF-American College of Cardiology foundation, AHA-American Heart Association
Class Recommendation

Level of evidence

- I – Randomized control trial
  - IA – established effective, ineffective, harmful
  - IB – probably effective, ineffective, harmful
- II – Non-randomized control trial
  - Case control, Cohort
- III – Studied with no control group
  - Observational study
- IV – Consensus or expert opinion
Secondary CAD Prevention
Class IA Recommendations

- Smoking Cessation
- Anti-Hypertensive Therapy
- Lipid Lowering Therapy with TLC + Statin
- Antiplatelet Therapy
- ACE/ARB Therapy with EF ≤40%
- Beta-blocker Therapy post-MI or with EF ≤40%
- Aldosterone Blocker post-MI with EF ≤40%
- Cardiac Rehabilitation

JACC 2011;58:2432-46
Secondary CAD Prevention
Class IB Recommendations

- Physical Activity
- Exercise testing for risk assessment
- Weight management
- Diabetes: TLC, BP and lipid control
- Influenza vaccine yearly

JACC 2011;58:2432-46
Question 4: The ABC’s of Prevention

Which of the following is an AHA/ACCF class IA recommendation for secondary CAD prevention?

A. Statin therapy
B. Cardiac rehabilitation
C. Weight loss, in patients with obesity
D. A and B
E. A and C
ABC’s of Effective CHD Prevention Therapies

- **A**ntiplatelet Rx, ACE/ARB, Aldo Blocker
- **B**eta blocker, blood pressure, body fat
- **C**holesterol control, cardiac rehabilitation
- **D**ietary therapy, diabetes Rx, depression Rx
- **E**xercise therapy, end smoking
- **F**ollow-up
“….The “last frontier of cardiovascular health” is the translation and application of our knowledge to improve the cardiovascular health of all people.”

-Claude Lenfant