Non-Invasive Management of Coronary Artery Disease

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Disclosures: None
Non-Invasive Management of Coronary Artery Disease

- Antiplatelet Therapy in Stable Ischemic Heart Disease
- Risk Factor Modification in Stable Ischemic Heart Disease
- Cardiac Shock Wave Therapy
- External Counterpulsation
- Spinal Stimulation
- Chelation Therapy
- Acupuncture
(Dual) Antiplatelet Therapy

• Acute Coronary Syndrome (ACS)
• Recent Percutaneous Intervention (PCI)
• Stable Ischemic Heart Disease
  • Stable ischemic heart disease (SIHD) is defined as confirmed obstructive coronary artery disease without recent (<1 year) ACS or PCI
Stable Ischemic Heart Disease

• Dual Antiplatelet Therapy (DAPT)
  • **CHARISMA**: Clopidogrel for High Atherothrombotic Risk Ischemic Stabilization, Management and Avoidance
    • 15,603 patients with multiple cardiovascular risk factors (most of whom were without a prior cardiovascular event)
    • No differences in the rates of MI, stroke, or death
    • Post hoc analysis of this study suggested that a subgroup of patients with documented prior MI, ischemic stroke, or symptomatic PAD might have had better outcomes from dual antiplatelet therapy (DAPT) with clopidogrel plus aspirin
  • Therefore… **Class IIb** recommendation
Stable Ischemic Heart Disease

• Dual Antiplatelet Therapy (DAPT)
  • PEGASUS-TIMI 54: The Long Term Use of Ticagrelor in Patients with Prior Myocardial Infarction
  • 21,162 patients with an MI in the prior 1 to 3 years were randomized to DAPT with ticagrelor and aspirin or aspirin monotherapy
  • There was a reduction in thrombotic endpoints with ticagrelor (7.8% DAPT patients vs. 9.0% aspirin patients, p<0.001) at the cost of increased bleeding (2.6% DAPT patients vs. 1.0% aspirin patients, p<0.001)
Stable Ischemic Heart Disease

Primary Endpoint

N = 21,162
Median follow-up 33 months

- Placebo (9.0%)
- Ticagrelor 90 (7.8%)
- Ticagrelor 60 (7.8%)

CV Death, MI, or Stroke (%)

- Ticagrelor 90 mg
  HR 0.85 (95% CI 0.75 – 0.96)
  P=0.008

- Ticagrelor 60 mg
  HR 0.84 (95% CI 0.74 – 0.95)
  P=0.004

Months from Randomization
Stable Ischemic Heart Disease

- Risk Factor Modification
  - Lipid Management
  - Blood Pressure Management
  - Diabetes Management
  - Smoking Cessation Counseling
  - Psychological Management
  - Alcohol Consumption
  - Avoid Exposure to Air Pollution
Stable Ischemic Heart Disease

• Risk Factor Modification: Lipid Management

• The Framingham Heart Study, Multiple Risk Factor Intervention Trial, and the Lipid Research Clinics trials all found a continuous, graded increase in coronary events with increasing LDL cholesterol in men and women who were initially free of IHD.

• 40mg/dl reduction translates to:
  • 10% reduction in all-cause mortality
  • 20% reduction in coronary mortality

• Diet low in saturated fat (<13g) and cholesterol (<7% of calories) = 10-15% reduction in LDL-C

• Physical activity & Weight Loss = >5% reduction in LDL-C

• Soluble fiber (5-10g/d) = 3-5% reduction in LDL-C

• Plant sterols (2g/d) = 5-15% reduction in LDL-C

• Statins = 5-30% reduction in LDL-C

• PCSK9 Inhibitors = >60% reduction in LDL-C
Stable Ischemic Heart Disease

- Blood Pressure Goal = < 140/90
- Systolic vs Diastolic Blood Pressure Lowering
- How low is too low?
  - Coronary blood flow
Stable Ischemic Heart Disease

- Stable Ischemic Heart Disease
  - Lipid Management
  - Blood Pressure Management
  - Diabetes Management
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- Type I Diabetes: 10-fold risk
- Type II Diabetes: 2-6 fold risk
- Goal HgA1C = < 7%
- Rosiglitazone should be avoided in patients with stable ischemic heart disease
Stable Ischemic Heart Disease

- Stable Ischemic Heart Disease
  - Lipid Management
  - Blood Pressure Management
  - Diabetes Management
- Smoking Cessation Counseling ➔ Tobacco Use = 5.5 RR; 30% risk reduction
- Psychological Management ➔ No correlation in risk
- Alcohol Consumption ➔ Female: 1 drink/d ; Male: 2-3 drinks/d
  (4 ounces of wine, 12 ounces of beer, or 1 ounce of spirits)
- Avoid Exposure to Air Pollution ➔ oxidative stress & inflammation
Stable Ischemic Heart Disease

• Physical Activity Recommendations: Class I
  • For all patients, the clinician should encourage 30 to 60 minutes of moderate-intensity aerobic activity, such as brisk walking, at least 5 days and preferably 7 days per week, supplemented by an increase in daily lifestyle activities (e.g., walking breaks at work, gardening, household work) to improve cardiorespiratory fitness and move patients out of the least-fit, least-active, high-risk cohort. (Level of Evidence: B)

  • For all patients, risk assessment with a physical activity history and/or an exercise test is recommended to guide prognosis and prescription. (Level of Evidence: B)

  • Medically supervised programs (cardiac rehabilitation) and physician-directed, home-based programs are recommended for at risk patients at first diagnosis. (Level of Evidence: A)
Cardiac Shock Wave Therapy

- Cardiac shock wave therapy for chronic refractory angina pectoris. A prospective placebo-controlled randomized trial
  - Twenty-one patients (mean age 68.2 ± 8.3 years, 19 males) with chronic refractory angina pectoris and evidence of inducible myocardial ischemia during MIBI-SPECT imaging, were randomized into a treatment (n = 11) and a placebo arm (n = 10).

  - Treated with echocardiographic guidance during nine sessions over a period of 3 months

  - 200 shots/spot (9--12 spots/session) with an energy intensity of 0.09 mJ/mm(2)

  - Clinical results showed significant improvement in symptoms, quality of life parameters and ischemic threshold during exercise in patients with chronic refractory angina pectoris treated with CSWT.

Cardiac Shock Wave Therapy
Cardiac Shock Wave Therapy

• Noninvasive therapy for the management of patients with advanced coronary artery disease
  • Prospective cohort study to examine the effects of CSWT application in patients who had end-stage CAD and were no option patients
  • 43 patients in the case group and 43 patients in the control group

• Clinical results showed improvement in:
  • Exercise time between the cases and the controls 6 months after treatment with CSWT (20.1 ± 15.7 min in cases vs. 10.1 ± 4.2 min in controls; P<0.0001)
  • CCS class scores (1.95 ± 0.80 in cases and 2.63 ± 0.69 in controls; P<0.0001)
  • NYHA class scores (1.95 ± 0.80 in cases vs. 2.48 ± 0.59 in controls; P<0.001)
External Counterpulsation (EECP)

- EECP is a technique that uses inflatable cuffs wrapped around the lower extremities to increase venous return and augment diastolic BP.
- The cuffs are inflated sequentially from the calves to the thigh muscles during diastole and are deflated instantaneously during systole.
- The resultant diastolic augmentation increases coronary perfusion pressure, and the systolic cuff depression decreases peripheral resistance.

Benefits:
- Improved LV diastolic filling and improved endothelial function
- Recruitment of collaterals
- Release of proangiogenic cytokines, and
- Peripheral training effect.

Treatment course:
- Consists of 35 hour-long treatment sessions, given 5 days a week.
External Counterpulsation (EECP)
External Counterpulsation (EECP)

• Clinical Outcomes
  • 55% reported adverse events, including leg and back pain and skin abrasions

• Anginal Class improved by 1 class in 86%
  • Class I – Angina only during strenuous or prolonged physical activity
  • Class II – Slight limitation, with angina only during vigorous physical activity
    • Ex: Walking or climbing stairs rapidly, Walking uphill, Walking or stair-climbing after meals, Emotional stress
  • Class III – Symptoms with everyday living activities
    • Ex:- walking 1-2 level blocks and climbing one flight of stairs in normal conditions and at a normal pace
  • Class IV – Inability to perform any activity without angina or angina at rest
Spinal Cord Stimulation

- Spinal cord stimulation at the T1 to T2 level has been advocated as a therapeutic option for patients with angina pectoris that is refractory to medical therapy and coronary revascularization.

- The stimulation lead is inserted into the epidural space and is connected to a pulse generator implanted subcutaneously.
Spinal Cord Stimulation

• Outcomes:
  • Prospective Italian Registry: A 50% reduction in anginal symptoms was observed in 73% of patients. CCS class improved by 1 class in 80% and by 2 classes in 42% of patients.

  • Similarly, in a cohort of 51 patients with refractory CCS Class III or IV angina, spinal cord stimulation was associated with a significant reduction in anginal episodes in 88% of subjects at 24 months of follow-up.

  • There were no significant complications of therapy in either series.

Chelation Therapy

• Consists of a series of intravenous infusions of disodium ethylene diamine tetraacetic acid (EDTA) in combination with other substances.

• Promoted as a noninvasive means of improving blood flow in atherosclerotic vessels.

• EDTA combines with polyvalent cations, such as calcium ions, to form soluble complexes that can be excreted.

• Advocates maintain that this process can result in regression of atherosclerotic plaques and relief of angina and that EDTA reduces oxidative stress in the vascular wall.

• The efficacy of chelation therapy in atherosclerotic disease is not supported by clinical trials.
Chelation Therapy

• The only RCT examining the effectiveness of chelation therapy on SIHD studied 84 patients with stable angina and a positive treadmill test for ischemia.

• Active therapy participants received weight-adjusted disodium EDTA chelation therapy for 3 hours per treatment, twice weekly for 15 weeks and then once monthly for an additional 3 months.

• There were no differences between groups in changes in exercise time to ischemia, exercise capacity, or quality-of-life scores.

Garlic, C0-Q-10, Selenium & Chromium

• Nutritional supplements for the prevention and treatment of cardiovascular disease have grown increasingly popular in the United States.

• Often promoted with anecdotal claims of efficacy.

• When data are available, they often conflict and consist of results of small, open-label trials.

• At present, there is no definitive evidence to recommend treatment with garlic, coenzyme Q10, selenium, or chromium for improving cardiovascular outcomes in patients with SIHD.
Acupuncture

• Early studies of the percutaneous approach demonstrated no therapeutic benefit
Thank you!
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