I. CAD Common in General Population
• > 60 million with cardiovascular disease
• Heart disease leading cause of death
  - More than 30% of deaths
  - Most are acute myocardial infarction
  - > 514,000 die each year, 350,000 before reaching the hospital

A. What is CAD?
• Atherosclerotic blockage of coronary arteries, resulting in ↓ coronary blood flow
• Real effect - decreased blood flow decreases oxygen delivery to myocardium
  - No problem under resting or moderate activity - sufficient oxygen supply
  - Acute oxygen demand shortage if heart works harder, ischemia
  - Ischemic heart, resultant angina pectoris, may result in MI

B. Dental Significance
• Majority can be safely treated in dental office, WITH APPROPRIATE PREPARATION
• 90% of life-threatening situations can be avoided
  - Pretreatment evaluation
  - Modifying dental therapy
• 10% must be prepared for recognition, management and treatment of possible medical emergency

C. Patient Evaluation
• Can the patient tolerate and survive dental therapy
  - Physically
  - Emotionally
• Risk category assignment
  - ASA I - ASA IV
• Recognition of CAD
• Manifestations of CAD

II. Recognition of CAD from Medical History
A. Known CAD - Establishing Severity of Disease
• Establish severity of disease
• Patient symptoms; chest pain, dyspnea, etc.
• Frequency of symptoms
  - Increasing or lack of control indicates more severe disease process
• What precipitates symptoms
  - Exercise, physical exertion, agitation or stress
• How patient treats symptoms
• How CAD is being medically managed
• More severe and/or harder to control
  - Greater number of cardiac medications and/or dosages
• Use and response to nitroglycerin
• Other medications used
  - Oral nitrates; isosorbide dinitrate
  - Transcutaneous nitrates - patches
  - Calcium channel blockers
  - Beta-blockers – specific or nonspecific
  - Others or combinations
• Cardiac reserve
  - Patient's tolerance before symptoms; stress needed to produce symptoms
  - Patient's lifestyle, active or sedentary
  - Climb stairs, walk on level ground before forced to stop
• Symptoms or diagnosis of congestive heart failure
  - Orthopnea, peripheral and ankle edema
• Results of exercise tolerance test
• Cardiac surgery and dates
  - Angioplasty and/or bypass grafting
  - Number of cardiac procedures

B. May use for Known and Unknown CAD
• Risk of CAD
  - Hypertension
  - Hypercholesterolemia - especially low-density lipoproteins
  - Smoking
  - Diabetes mellitus
  - Family history

C. ASA I-IV Categorization
ASA I-IV categorization is a judgement based on:
• Medical history
• Drug history
• Physical and clinical examination
  - Vital signs: BP, respiration, pulse
• Emotional evaluation
• Medical consultation
• Personal experiences

D. ASA Physical Status Classification
• ASA I: A patient without systemic disease, a normal, healthy patient
• ASA II: A patient with mild systemic disease
• ASA III: A patient with severe systemic disease that limits activity, but is not incapacitating
• ASA IV: A patient with incapacitating systemic disease that is a constant threat to life

E. Blood Pressure Guidelines
<table>
<thead>
<tr>
<th>BP Classification</th>
<th>Systolic BP, mm Hg</th>
<th>Disastolic BP, mm Hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>and &lt;80</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120-139</td>
<td>or 80-89</td>
</tr>
<tr>
<td>Stage 1 hypertension</td>
<td>140-159</td>
<td>or 90-99</td>
</tr>
<tr>
<td>Stage 2 hypertension</td>
<td>≥160</td>
<td>or ≥100</td>
</tr>
<tr>
<td>Major Concern</td>
<td>&gt;180</td>
<td>or &gt;110</td>
</tr>
</tbody>
</table>

**BASIC CAVEAT** of treating medically compromised patients. Never jeopardize the patient's medical control or stability. The first consideration of treatment planning is the systemic phase!

III. Treatment Modifications for CAD
- Prevent patient's heart from becoming overexerted to develop symptoms
- Maximize amount of oxygen to heart
- Minimize cardiac workload
  - Stressed, agitated patients, increases HR and BP
- Modifications based on severity of patient's CAD
  A. Minimize stress during dental treatment
     - Relaxed office atmosphere
     - Explain procedures, decreases fear of unknown and surprises
       - Mild expected unpleasant experience is less stressful, i.e. injections, probing, etc., if anticipated and explained
     - Crucial is good local anesthesia
       - Allow sufficient time for maximum effort
  B. Adjunctive methods of relaxation to decrease stress and anxiety
     - Headphones
     - Hypnosis
     - Videotapes
     - Distraction techniques
  C. Pharmacologic anxiolytic methods
     - Nitrous Oxide/Oxygen or Oxygen alone at 4-6 L/minute
     - Diazepam - Valium
     - Others - Xanax, etc. by patient's previous experience and usage
     - Prophylactic dose of sublingual Nitroglycerin or patch, especially if used on prn basis
  D. At each appointment have a pre and post treatment BP, pulse and evaluation
     - BP; time, arm, etc.
       - right arm, sit, 10:00 AM, 130/88
     - Pulse; rate, rhythm, strength
- 15 seconds x 4 = rate
  • Ask and record if any changes in their health
  • Make certain they have taken their regular medications
  • Compare information to baseline

IV. Timing of Dental Therapy
• Six months after MI - N.B. new information can treat sooner with permission from M.D.
  Immediate post infarction:
  - Site of infarction weaker, may rupture
  - Cardiac arrhythmias
  - Time for collateral circulation revascularization
• Some suggest more extensive, invasive procedures should be delayed for one year
• Consultation with cardiologist
  - Specific questions for safe dental management
• Worsening symptoms defer elective dental therapy until medical control or therapy
• 20% of unstable angina progress to acute MI within three months
• Angina pectoris
• Wait 30 days after initial or infrequent attack of angina pectoris
• Early AM appointments best
• Correlate to medication schedule
• Time of year important for some CAD patients

V. Appointment Timing and Duration
• Patient - One long premedicated appointment best
• Logistics - patient transportation
• Office demands; vacation schedules
• Coordinate with other medical care

VI. Local Anesthetics and Cardiac Patients
A. Advantages of administering minute physiologic amounts of epinephrine for dental treatment outweighs dangers
  - Nonstressed adult 70 kg - .007-.014 mg epi per minute
  - Stressed is .280 mg
  - Epi 1:100,000 is .018-.054 mg or 1-3 cartridges
  - Therefore, many agree 1-2 or .04 mg is within safety limits.

VIII. Prepare for Cardiac Emergency Situation
• Office emergency plan
• Community emergency services
• Office staff preparation - BLS, CPR, etc.
• Adequate emergency kit
• Know specific cardiac emergency signs, symptoms, management and treatment

IX. Useful References
