Dental management of cardiovascular patients

Falace, chapter 2-6
Burket, chapter 13
Infective endocarditis

- Potential problems related to dental care:
  - Dental procedures that involve the manipulation of gingival tissues or the periapical region of teeth or perforation of the oral mucosa can produce a bacteremia.
  - Bacteremias can also be produced on a daily basis as the result of tooth brushing, flossing, chewing, or the use of toothpicks or irrigating devices.
  - Patients with mechanical prosthetic heart valves may have excessive bleeding following invasive dental procedures as the result of anticoagulant therapy.
- Oral manifestation:
  - Oral petechia

- Prevention of problems:
  - Identify patients at greatest risk for adverse outcomes of IE, including patients with:
    - Prosthetic cardiac valves
    - A history of previous IE
    - Certain types of congenital heart disease (i.e., unrepaired cyanotic congenital heart disease, including patients with palliative shunts and conduits, completely repaired congenital heart disease for the first 6 months after a procedure, or repaired congenital heart disease with residual defect)
    - Cardiac transplantation recipients who develop cardiac valvulopathy
• Prescribe antibiotic prophylaxis for only those patients above who undergo dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa.

• If prophylaxis is required for an adult, take a single dose 30 minutes to 1 hour before the procedure:
  • Standard (oral amoxicillin, 2 g)
  • Allergic to penicillin (oral *cephalexin 2 g, oral clindamycin 600 mg, or azithromycin or clarithromycin 500 mg).
*NOTE: Cephalexin should not be used in individuals with a history of anaphylaxis, angioedema, or urticaria with penicillins.

- Unable to take oral medications (intravenous [IV] or intramuscular [IM] ampicillin(2g), cefazolin(1g), or ceftriaxone(1g))
- Allergic to penicillin and unable to take oral medications (IV or IM clindamycin phosphate(600mg), cefazolin, or ceftriaxone(1g))
Treatment Planning Modifications:
• Encourage the maintenance of optimal oral hygiene in all patients at increased risk for IE.
• Provide antibiotic prophylaxis for only those patients with the highest risk for adverse outcomes of IE.
• Provide antibiotic prophylaxis for all dental procedures, except:
  • Routine anesthetic injections
  • Taking of radiographs
  • Placement of removable prosthodontic or orthodontic appliances
  • Adjustment of orthodontic appliances
  • Shedding of deciduous teeth or bleeding from trauma to the lips or oral mucosa.
• For patients selected for prophylaxis, perform as much dental treatment as possible during each coverage period.
• A second antibiotic dose may be indicated if the appointment lasts longer than 4 to 6 hours, or if multiple appointments occur on the same day.
• For multiple appointments, allow at least 9 days between treatment sessions so that penicillin-resistant organisms can clear from the oral flora. If treatment becomes necessary before 9 days have passed, select one of the alternative antibiotics for prophylaxis.
• For patients with prosthetic heart valves who are taking anticoagulants, the dosage may have to be reduced on the basis of international normalized ratio (INR) level and the degree of invasiveness of the planned procedure.
Hypertension

- Potential Problems Related to Dental Care:
  1. Routine delivery of dental care to a patient with severe uncontrolled hypertension could result in a serious outcome such as angina, myocardial infarction, or stroke.
  2. Stress and anxiety related to the dental visit may cause an increase in blood pressure, leading to angina, myocardial infarction, or stroke.
  3. In patients taking nonselective beta blockers, excessive use of vasoconstrictors can potentially cause an acute elevation in blood pressure.
  4. Some antihypertensive drugs can cause oral lesions or oral dryness and can predispose patients to orthostatic hypotension.
Oral Manifestations:

- No oral complications are due to hypertension itself; however, adverse effects such as dry mouth, taste changes, and oral lesions may be drug related.

Prevention of Problems:

- Detection of patients with hypertension and referral to a physician if poorly controlled or uncontrolled. Defer elective dental treatment if blood pressure (BP) is $\geq 180/110$. 
• For patients who are being treated for hypertension, consider the following:
  • Take measures to reduce stress and anxiety.
  • Provide oral sedative premedication and/or inhalation sedation.
  • Provide local anesthesia of excellent quality.
  • For patients who are taking a nonselective beta blocker, limit epinephrine to ≤2 cartridges of 1:100,000 Epinephrine (0.036 mg epi or 0.2 mg levonordefrin 1:20000).
• Avoid epinephrine-containing gingival retraction cord (tetrahydrozoline or oxymetazoline HCl 0.05%).
• For patients with upper level stage 2 hypertension, consider intraoperative monitoring of BP, and terminate appointment if BP reaches 180/110.
• Make slow changes in chair position to avoid orthostatic hypotension.
Treatment Planning Modifications:

- For patients with BP <180/110, and no evidence of target organ involvement, any treatment may be provided.
- For patients with BP ≥ 180/110, defer elective dental care.
- For patients with target organ involvement, refer to appropriate chapter for management recommendations.
Angina pectoris

- Potential Problems Related to Dental Care:
  1. The stress and anxiety of a dental visit could precipitate an anginal attack, myocardial infarction, or sudden death.
  2. For patients who are taking a nonselective beta blocker, the use of excessive amounts of epinephrine could precipitate a dangerous elevation in blood pressure.
  3. Patients who are taking aspirin or other platelet aggregation inhibitor may experience excessive bleeding.
  4. Questions may arise as to the necessity of antibiotic prophylaxis for patients with a history of coronary artery bypass graft, balloon angioplasty, or stent.
Oral Manifestations:

- No oral complications are due to angina; however, adverse effects such as dry mouth, taste changes, and oral lesions may be drug related.

- Excessive bleeding may occur as the result of the use of aspirin or other platelet aggregation inhibitors.
Prevention of Problems:

Unstable Angina (major risk)

- Elective dental care should be deferred; if care becomes necessary, it should be provided in consultation with the physician.

Management may include establishment of an IV line; sedation; monitoring of electrocardiogram, pulse oximeter, and blood pressure; oxygen; cautious use of vasoconstrictors; and prophylactic nitroglycerin.
Stable Angina
Elective dental care may be provided with the following management considerations:
• For stress/anxiety reduction: Provide oral sedative premedication and/or inhalation sedation if indicated, assess pretreatment vital signs and availability of nitroglycerin, and limit the quantity of vasoconstrictor used.
• For patients who are taking a nonselective beta blocker: Limit epinephrine to ≤2 cartridges of 1:100,000 epinephrine.
• Avoid the use of epinephrine-impregnated gingival retraction cord.
• Avoid anticholinergics
• Provide local anesthesia of excellent quality and postoperative pain control.
• If the patient is taking aspirin or another platelet aggregation inhibitor: Excess bleeding is usually manageable through local measures only; discontinuation of medication is not recommended.
• Antibiotic prophylaxis is not recommended for patients with a history of coronary artery bypass graft (CABG), angioplasty, or stent.
Treatment planning modifications:

**Unstable Angina**
- Dental treatment should be limited to urgent care only such as treatment of acute infection, bleeding, or pain.

**Stable Angina**
- Any indicated dental treatment may be provided if appropriate management issues are considered.
PREVIOUS MYOCARDIAL INFARCTION

Potential Problems Related to Dental Care:
1. The stress and anxiety of a dental visit could precipitate an anginal attack, myocardial infarction, or sudden death in the office.
2. Patients may have some degree of heart failure.
3. If the patient has a pacemaker, some dental equipment may potentially cause electromagnetic interference.
4. In patients who are taking a nonselective beta blocker, excessive amounts of epinephrine may cause a dangerous elevation in blood pressure.
5. Patients who are taking aspirin or another platelet aggregation inhibitor or coumadin may experience excessive postoperative bleeding.

6. Questions may arise as to the necessity of antibiotic prophylaxis for patients with a history of CABG, balloon angioplasty, or stent.
Oral Manifestations:

- No oral complications are due to myocardial infarction; however, adverse effects such as dry mouth, taste changes, and oral lesions may be drug related. Also, bleeding may be excessive because of the use of aspirin, other platelet aggregation inhibitors, or Coumadin.
Prevention of problems:

Recent Myocardial Infarction (<1 month) (major risk)

- Elective dental care should be deferred; if care becomes necessary, it should be provided in consultation with the physician.
- Management may include establishment of an IV line; sedation; monitoring of electrocardiogram, pulse oximeter, and blood pressure; oxygen; cautious use of vasoconstrictors; and prophylactic nitroglycerin.
Past Myocardial Infarction (>1 month without symptoms) (intermediate risk)
• Elective dental care may be provided with the following management considerations:
• For stress/anxiety reduction: Provide oral sedative premedication and/or inhalation sedation if indicated, assess pretreatment vital signs and availability of nitroglycerin, and limit the quantity of vasoconstrictor used.
• For patients who are taking a nonselective beta blocker: Limit epinephrine to ≤2 cartridges of 1:100,000 epinephrine.
• Avoid the use of epinephrine-impregnated gingival retraction cord.
• Avoid anticholinergics.
• Provide local anesthesia of excellent quality and postoperative pain control.
• If the patient is taking aspirin or another platelet aggregation inhibitor, excessive bleeding is usually manageable by local measures only; discontinuation of medication is not recommended.
• If the patient has a pacemaker or implanted defibrillator, avoid the use of electrosurgery and ultrasonic scalers; antibiotic prophylaxis is not recommended for these patients.
• If the patient is taking Coumadin, the INR should be 3.5 or less prior to performance of invasive procedures.
• Antibiotic prophylaxis is not recommended for patients with a history of CABG, angioplasty, or stent.
Treatment planning modifications:

Recent Myocardial Infarction
• Dental treatment should be limited to urgent care only such as treatment of acute infection, bleeding, or pain

Past Myocardial Infarction
• Any indicated dental treatment may be provided taking into consideration appropriate management considerations
Arrhythmia

- Potential Problems Related to Dental Care:
  1. The stress and anxiety of dental treatment or excessive amounts of epinephrine may induce life-threatening arrhythmias in susceptible patients.
  2. Patients with existing arrhythmia are at increased risk for serious complications such as angina, myocardial infarction, stroke, heart failure, or cardiac arrest.
  3. Patients with a pacemaker or a defibrillator are at risk for possible malfunction caused by electromagnetic interference from some dental equipment; some question about the need for prophylactic antibiotics may arise.
4. In patients who are taking a nonselective beta blocker, excessive amounts of epinephrine may cause a dangerous elevation in blood pressure.

5. Patients with atrial fibrillation who are taking coumadin are at risk for excessive postoperative bleeding.

6. Patients who are taking digoxin are at risk for arrhythmia if epinephrine is used; digoxin toxicity is also a potential problem.
Oral manifestation:

- No oral complications are due to arrhythmia; however, adverse effects such as dry mouth, taste changes, and oral lesions may be drug related.

- Excessive bleeding may occur as the result of use of Coumadin.
Prevention of problems:

• Determine the nature, severity, and appropriate treatment of arrhythmia through history and clinical findings; if unclear, obtain medical consultation to confirm the following:

• For high-risk arrhythmia (high-grade atrioventricular [AV] block, symptomatic ventricular arrhythmia, supraventricular arrhythmia with uncontrolled ventricular rate):
1. Elective dental care should be deferred; if care becomes necessary, it should be provided in consultation with the physician.

2. Management may include establishment of an IV line; sedation; monitoring of electrocardiogram, pulse oximeter, and blood pressure; oxygen; and cautious use of vasoconstrictors.

• For intermediate- and low-risk arrhythmia (essentially all others):
1. Elective dental care may be provided with the following management considerations for stress/anxiety reduction: Provide oral sedative premedication and/or inhalation sedation if indicated; assess pretreatment vital signs; avoid excessive use of epinephrine (for patients who are taking a nonselective beta blocker, limit epinephrine to $\leq 2$ cartridges of 1:100,000 epinephrine, avoid the use of epinephrine-impregnated gingival retraction cord, and provide local anesthesia of excellent quality and postoperative pain control).
2. For patients who are taking Coumadin, the INR should be 3.5 or less prior to any invasive dental procedure; provide local measures for hemostasis.

3. For patients with a pacemaker or an implanted defibrillator, avoid the use of electrosurgery and ultrasonic scalers; antibiotic prophylaxis is *not* recommended for these patients.

4. For patients who are taking digoxin, avoid the use of epinephrine because of the increased risk of inducing arrhythmia; be observant for signs of digoxin toxicity (e.g., hypersalivation).
Treatment planning modifications:

**High-Risk Arrhythmias**
- Dental treatment should be limited to urgent care only such treatment of acute infection, bleeding, or pain.

**All Other Arrhythmias**
- Any indicated dental treatment may be provided as long as appropriate management issues are considered.
Heart failure

- Potential problem related to dental care:
  1. Providing dental treatment to a patient with symptomatic or uncontrolled heart failure may result in worsening of symptoms, acute failure, arrhythmia, myocardial infarction, or stroke.
  2. Patients with heart failure may have difficulty breathing and may not tolerate a supine chair position.
  3. Heart failure is due to an underlying condition such as coronary artery disease or hypertension that may require management considerations.
4. In patients who are taking a nonselective beta blocker, excessive amounts of epinephrine may cause a dangerous elevation in blood pressure.

5. The use of epinephrine in patients who are taking digoxin may cause arrhythmia.
   - Oral manifestation:
     - No oral complications are caused by heart failure; however, adverse effects such as dry mouth, taste changes, and oral lesions may be drug related.
     - Digoxin can cause an enhanced gag reflex.
Prevention of problem: Symptomatic Heart Failure (NYHA Class III or IV)

- Elective dental care should be deferred and medical consultation obtained; if care becomes necessary, it should be provided in consultation with the physician. Management may include establishment of an IV line; sedation; monitoring of electrocardiogram, pulse oximeter, and blood pressure; oxygen; cautious use of vasoconstrictors; and possibly, prophylactic nitroglycerin.
Asymptomatic/Mild Heart Failure (NYHA Class I and II and possibly III)

- Elective dental care may be provided with the following management considerations:
  - For stress/anxiety reduction: Provide oral sedative premedication and/or inhalation sedation if indicated, and assess pretreatment vital signs.
  - For patients who are taking a nonselective beta blocker, limit epinephrine to ≤2 cartridges of 1:100,000 epinephrine, avoid the use of epinephrine-impregnated gingival retraction cord, and provide local anesthesia of excellent quality and postoperative pain control.
• Ensure a comfortable chair position; supine position may not be tolerated.
• If patient is taking digoxin, avoid the use of epinephrine.
• Avoid the use of nonsteroidal anti-inflammatory drugs (NSAIDs).
  ▪ Treatment planning modifications:

  **Asymptomatic/Mild Heart Failure (NYHA Class I and II)**
  • Any necessary dental treatment may be provided.

  **Symptomatic Heart Failure (NYHA Class III or IV)**
  • Dental treatment should be limited to urgent care only such as treatment of acute infection, bleeding, or pain.