

CAUSES OF ISCHEMIC HEART DISEASE AND CORONARY ARTERY FAILURE

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Annotation:

Coronary artery disease (CAD), also called coronary heart disease (CHD), ischemic heart disease (IHD), myocardial ischemia or simply heart disease, involves the reduction of blood flow to the heart muscle due to build-up of atherosclerotic plaque in the arteries of the heart. It is the most common of the cardiovascular diseases. Types include stable angina, unstable angina, myocardial infarction, and sudden cardiac death. A common symptom is chest pain or discomfort which may travel into the shoulder, arm, back, neck, or jaw. Occasionally it may feel like heartburn. Usually symptoms occur with exercise or emotional stress, last less than a few minutes, and improve with rest. Shortness of breath may also occur and sometimes no symptoms are present. In many cases, the first sign is a heart attack. Other complications include heart failure or an abnormal heartbeat. It's heart problems caused by narrowed heart arteries. When arteries are narrowed, less blood and oxygen reach the heart muscle. This is also called coronary artery disease and coronary heart disease. This can lead to heart attack. Ischemia often causes chest pain or discomfort known as angina pectoris.

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The most common symptom is chest pain or discomfort that occurs regularly with activity, after eating, or at other predictable times; this phenomenon is termed stable angina and is associated with narrowing of the arteries of the heart. Angina also includes chest tightness, heaviness, pressure, numbness, fullness, or squeezing. Angina that changes in intensity, character or frequency is termed unstable. Unstable angina may precede myocardial infarction. In adults who go to the emergency department with an unclear cause of pain, about 30% have pain due to coronary artery disease. Angina, shortness of breath, sweating, nausea or vomiting, and lightheadedness are



signs of a heart attack, or myocardial infarction, and immediate emergency medical services are crucial.

With advanced disease, the narrowing of coronary arteries reduces the supply of oxygen-rich blood flowing to the heart, which becomes more pronounced during strenuous activities during which the heart beats faster. For some, this causes severe symptoms, while others experience no symptoms at all.

All must be factored into a dental management plan so that a rational and safe decision can be made—specifically, to determine whether a patient can safely tolerate a planned procedure. The American College of Cardiology and the American Heart Association have published risk stratification guidelines for patients with various types of heart disease who are undergoing noncardiac surgical procedures. These guidelines can provide a framework for determination of associated risk for surgical as well as for nonsurgical dental procedures (Boxes 4-3 and 4-4). For example, recent MI (within the past 7 to 30 days) and unstable angina are classified as clinical predictors of major risk for perioperative complications. By contrast, a past history of ischemic heart disease (i.e., stable (mild) angina and past history of MI) is considered one of the intermediate risk factors for perioperative complications. Accordingly, a past history of ischemic heart disease with no other clinical risk factors, as shown in Box 4-3, is unlikely to be associated with significant risk for an adverse event during dental procedures.

The type and magnitude of the planned procedure also must be considered. On the basis of these guidelines, extensive oral and maxillofacial surgical procedures, and perhaps some of the more extensive periodontal surgical procedures, would fall into the intermediate cardiac risk category under “head and neck procedures,” with a 1% to 5% risk. Minor oral surgery and periodontal surgery, would fall within the low-risk, “superficial surgery” or “ambulatory surgery” category, with less than 1% risk. Although not included in the list, nonsurgical dental procedures are likely to carry even less of a risk, considering that local anesthesia is used, minimal blood loss is anticipated, and procedures typically are of short duration. Procedures that are performed with the patient under general anesthesia and have the potential for significant blood and fluid loss with resultant adverse hemodynamic effects pose the highest risk.

The final element included in the AHA/ACC Guidelines is the ability of the patient to perform basic physical tasks. The energy expended in performing



these tasks is measured in metabolic equivalents of tasks (METs), which is a measure of oxygen consumption. Studies have shown that a person who cannot perform at a minimum of a 4 MET level is at increased risk for a cardiovascular event. Climbing a flight of stairs requires a 4-MET effort; thus, a person who cannot climb a flight of stairs without chest pain or shortness of breath is at increased risk.

These risk stratification guidelines may be applied to various dental management scenarios. For example, a patient with unstable angina or recent MI is assigned to the major cardiac risk category. It also is likely that this person would have difficulty climbing a flight of stairs. By contrast, if the planned dental procedure is limited to routine clinical examination with x-rays (extremely low risk category), and the patient is stable and not anxious, the risk for an adverse occurrence is minimal; thus, alterations in the dental management approach would be unnecessary. If, however, a patient with stable angina or a past history of MI (intermediate risk category), with minimal cardiac reserve, is scheduled for multiple extractions and implant placement (low to intermediate risk category), the risk for an adverse perioperative event is more significant, and a more complex dental management plan may be required.

Angina Pectoris/Past History of Myocardial Infarction

A determination should be made regarding the presence, severity, and stability of ischemic symptoms. A patient with stable angina characteristically describes the occurrence of chest pain in a consistent, recurring, and predictable pattern. Pain is precipitated by typical physical activity such as exercising, mowing the lawn, or climbing stairs and subsides within 5 to 15 minutes with rest or the use of nitroglycerin. Pain occurs in a chronic, unchanging pattern over time. These patients pose an intermediate cardiac risk.

A patient with unstable angina conversely may describe the recent onset of chest pain, or progressively worsening chest pain that occurs with physical exertion or at rest. A pattern of increasing severity, frequency, or duration of pain is typical. Pain occurring at rest or during sleep is particularly ominous. Patients with unstable angina should be considered to be at major cardiac risk and are not candidates for elective dental care.

Patients who have had an MI in the past may or may not have ischemic symptoms. For an asymptomatic patient with no other risk factors, risk for an



adverse event is minimal. If, however, symptoms such as chest pain, shortness of breath, dizziness, or fatigue are present, the patient falls in the major risk category, and elective dental care should be deferred and medical consultation obtained. Likewise, a patient who has a history of MI in association with other clinical risk factors is at increased risk for an adverse event, and medical consultation should be obtained before elective dental care.

Based on the assessment of medical risk, the type of planned dental procedure, and the stability and anxiety level of the patient, general management strategies for patients with stable angina or a past history of MI without ischemic symptoms (intermediate risk category) and no other risk factors may include the following: short appointments in the morning, comfortable chair position, pretreatment vital signs, availability of nitroglycerin, oral sedation, nitrous oxide–oxygen sedation, profound local anesthesia, limited amount of vasoconstrictor, avoidance of epinephrine-impregnated retraction cord, and effective postoperative pain control. For patients who have had balloon angioplasty with placement of a coronary artery stent, or for those who have undergone a CABG procedure, antibiotic prophylaxis is not recommended²⁹ (Box 4-5). In addition, NSAIDs should be avoided in patients with established cardiovascular disease, especially those whose cardiac history includes an MI. In a recent study, the use of NSAIDs in patients with previous MI was shown to increase the risk for a subsequent myocardial infarction, even after only 7 days of NSAID administration.³⁰ In this study, only naproxen did not increase the risk. Whether shorter duration of use decreases the risk is not clear, but this correlation seems likely; thus, we recommend that NSAIDs be used with caution, if at all, in patients who have had a previous MI, and that if an NSAID is used, naproxen be the drug of choice, administered for less than 7 days.

For patients with symptoms of unstable angina or those who have had an MI within the past 30 days (major risk category), elective care should be postponed (Box 4-6). If treatment becomes necessary, it should be performed as conservatively as possible and directed primarily toward pain relief, infection control, or the control of bleeding, as appropriate. Consultation with the physician is advised. Additional management recommendations may include establishing and maintaining an intravenous line, continuously monitoring the ECG and vital signs, using a pulse oximeter, and administering



nitroglycerin prophylactically just before the initiation of treatment.²⁵ These measures may require that the patient be treated in a special patient care facility or hospital dental clinic.

Vasoconstrictors

The use of vasoconstrictors in local anesthetics poses potential problems for patients with ischemic heart disease because of the possibility of precipitating cardiac tachycardias, arrhythmias, and increases in blood pressure. Local anesthetics without vasoconstrictors may be used as needed. If a vasoconstrictor is necessary, patients with intermediate clinical risk factors and those taking nonselective beta blockers can safely be given up to 0.036 mg epinephrine (two cartridges containing 1 : 100,000 epinephrine) at one appointment; intravascular injections are to be avoided. Greater quantities of vasoconstrictor may well be tolerated, but increasing quantities increase the risk of adverse cardiovascular effects. For patients at higher risk, the use of vasoconstrictors should be discussed with the physician. Studies have shown, however, that modest quantities of vasoconstrictors may be used safely even in high-risk patients when accompanied by oxygen, sedation, nitroglycerin, and excellent pain control measures.³¹⁻³³

For patients at all levels of cardiac risk, the use of gingival retraction cord impregnated with epinephrine should be avoided because of the rapid absorption of a high concentration of epinephrine and the potential for adverse cardiovascular effects. As an alternative, plain cord saturated with tetrahydrozoline HCl 0.05% (Visine; Pfizer Inc, New York, New York) or oxymetazoline HCl 0.05% (Afrin; Schering-Plough, Summit, New Jersey) provides gingival effects equivalent to those of epinephrine without adverse cardiovascular effects.³⁴

Bleeding

Patients who take daily aspirin and/or other antiplatelet agents (e.g., clopidogrel) can expect some increase in surgical and postoperative bleeding, but this is generally not clinically significant and can be controlled with local measures only. Discontinuation of these agents before dental treatment generally is unnecessary. Patients who are taking warfarin for anticoagulation can safely undergo dental or surgical procedures, provided that the INR is 3.5 or less (see Chapter 24). Discontinuation of antiplatelet agents and anticoagulants (e.g., warfarin) before dental treatment and routine extractions generally is unnecessary.



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