Sexual Activity in Patients With Angina

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Coital angina is angina that occurs during the minutes or hours following sexual activity. More than 6 million individuals in the United States experience angina pectoris. Coital angina appears to represent less than 5% of all anginal attacks. For various reasons, fewer middle aged or older women engage in sexual activity than age-matched men. Accordingly, the prevalence of coital angina is higher in men than in women. The comparative physical demands of sexual activity in men and women are unknown. Frequency of coitus diminishes with age in both women and men, especially after the onset of coronary artery disease, which occurs some 10 years later in women than in men.

Coital angina is rare in patients who do not have angina during strenuous physical exertion. It is more prevalent in sedentary individuals with severe coronary artery disease who experience angina with minimal physical activity. Among these sedentary individuals, myocardial oxygen demand during coitus may exceed that during customary activities of daily living; for these individuals, sex may be a provocative test.

Mechanisms of Coital Angina

Coital angina reflects an imbalance between myocardial oxygen supply and demand, resulting from one or both of the following: an increase in myocardial oxygen demand because of the increase in heart rate and blood pressure associated with sexual activity; a decrease in myocardial oxygen supply because of reduction in coronary blood flow associated with erosion or rupture of a coronary artery plaque. An increase in myocardial oxygen demand is a dynamic, often transient process that may resolve spontaneously or in response to nitroglycerin, which reduces blood pressure. A decrease in myocardial oxygen supply is a structural, often progressive process that may fail to respond to nitroglycerin.

The standard clinical measure of physical exertion is the metabolic equivalent of the task (MET). One MET represents oxygen consumption in the resting state (equivalent to 3.5 mL/kg per minute). The energy requirements of selected physical activities range from 2 METs for walking at 2 mph to 13 METs for completion of the fourth stage of the Bruce treadmill exercise test. Sexual activity is often equated with an exercise workload of 2 to 3 METs in the preorgasmic phase and 3 to 4 METs during the orgasmic stage. These levels are comparable with walking at 2 or 3 mph, respectively. This standard, established in men with a mean age of 33 years, may overstate the physical demand of sexual activity in middle-aged and older individuals. Few studies of oxygen consumption during sexual activity have been conducted in older individuals. In general, sexual activity in long-established relationships tends to become less vigorous over time. Sexual arousal accounts for a substantial amount of the increase in oxygen consumption measured during sexual activity.

The cardiovascular tolerance for sexual activity in an individual can be expressed as the functional reserve, which represents the difference between estimated peak oxygen consumption based on treadmill exercise testing and the actual measurement of oxygen consumption during sexual activity. For example, patients able to climb 2 flights of stairs without limiting symptoms or to complete stage II of a standard Bruce treadmill test (equivalent to 6-7 METs) are generally free of cardiovascular symptoms during sexual activity.

Risk Stratification

Sexual activity is the cause of less than 1% of all acute myocardial infarctions (MIs). In contrast, physical exertion and anger account for as many as 5% and 3% of acute MIs, respectively. Virtually all patients who experience acute MIs have underlying atherosclerosis but fewer than half have had prior symptoms of coronary artery disease. For those patients who do have symptoms of coronary artery disease, it is important to evaluate the risk of acute MI posed by customary activities, including sexual activity. The Princeton Conference developed guidelines for evaluating the risk of MI after sexual activity in these patients. The guidelines also give recommendations for safe use of phosphodiesterase-5 (PDE-5) inhibitors in patients with erectile dysfunction.

The stepwise risk stratification approach adopted by the Princeton Conference...

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ference relies on coronary risk factors, historical features, and the results of specialized cardiac testing (BOX). It is designed to distinguish the great majority of patients (60%-70%) who are low-risk from the minority of patients (10%-15%) who are high-risk. The intermediate-risk group consists of approximately 15% to 30% of patients whose risk lies between the low-risk and high-risk groups. Specialized cardiac testing such as treadmill exercise is often useful in reclassifying these intermediate-risk patients into low-risk or high-risk categories. Exercise testing enables not only an objective assessment of exercise tolerance but also helps to identify prognostic markers, such as the heart rate, blood pressure, and workload at which symptoms of angina, dyspnea, and fatigue appear.

Low-risk patients with erectile dysfunction can be treated with a PDE-5 inhibitor without undergoing further diagnostic evaluation (FIGURE 1). High-risk patients should undergo cardiac assessment and be appropriately treated before being considered for PDE-5 inhibitors. Treatments that are used to reduce the risk of acute MI and death in these patients include combination pharmacotherapy, such as ß-blockers, angiotensin-converting enzyme inhibitors, statins, and antiplatelet agents; percutaneous coronary interventions; and coronary artery bypass graft surgery.

**Box. Risk Stratification for Sexual Activity in Patients With Cardiovascular Disease**

**Low Risk**
- Asymptomatic, <3 major risk factors for CAD
- Controlled hypertension
- Mild, stable angina
- Successful coronary revascularization
- Uncomplicated post-MI (>6-8 wk)
- Mild valvular disease
- Modified left ventricular disease/congestive heart failure (NYHA class I)

**Intermediate Risk**
- ≥3 Major risk factors for CAD, excluding gender
- Moderate, stable angina
- Recent MI (>2 wk, <6 wk)
- Left ventricular disease/congestive heart failure (NYHA class II)
- Noncardiac sequelae of atherosclerotic disease (eg, stroke syndrome, peripheral vascular disease)

**High Risk**
- Unstable or refractory angina
- Uncontrolled hypertension
- Left ventricular disease/congestive heart failure (NYHA class III/IV)
- Recent MI (<2 wk), stroke syndrome
- High-risk arrhythmias
- Hypertrophic, obstructive, and other cardiomyopathies
- Moderate/severe valvular disease

*Adapted with permission from DeBusk et al. CAD indicates coronary artery disease; MI, myocardial infarction; and NYHA, New York Heart Association.

**Figure 1. Stepwise Risk Stratification and Patient Management**

Assessment of Sexual Function
- Clinical Evaluation
- Physical Examination
- Relevant Laboratory Testing

Risk Stratification

Low Risk (60% to 70% of Patients)

Intermediate Risk (15% to 30% of Patients)

High Risk (10% to 15% of Patients)

Specialized Cardiovascular Assessment
- Exercise Testing With or Without Radionuclide Imaging
- Pharmacologic Stress Testing With or Without Echocardiographic Imaging

Restratification

Initiate or Resume Sexual Activity or Treat for Sexual Dysfunction Without Further Cardiac Testing

Defer Sexual Activity Until Cardiac Condition Stabilized After Appropriate Testing and Treatment

Adapted with permission from DeBusk et al. Stratification of risk is a 2-step process: clinical evaluation permits identification of low- and high-risk individuals; specialized cardiovascular assessment permits individuals at intermediate clinical risk to be restratified into low- or high-risk categories. Low-risk patients identified at either step can initiate or resume sexual activity or be treated for sexual dysfunction. High-risk patients identified at either step should defer sexual activity until the cardiac condition is stabilized.
Management of Coital Angina

Angina pectoris is common in patients with coronary artery disease. Not all episodes of angina occurring after sexual activity are because of the sexual activity, however, especially if angina also occurs during other activities. Angina occurring in the 2 hours after coitus, especially at rest, can be causally linked to coitus, whereas angina occurring more than 2 hours after coitus, especially during exercise, may be only coincidental. Coital angina may resolve spontaneously, respond to treatment with nitroglycerin, or progress to acute MI or death. Coital angina that is severe or persistent often represents not simply angina pectoris but an acute coronary syndrome requiring prompt diagnosis and intensive treatment. According to guidelines developed by the Agency for Healthcare Research and Quality, angina that lasts 20 minutes or more is classified as unstable.14 Patients who experience coital angina and have not taken a PDE-5 inhibitor should use nitroglycerin according to standard American Heart Association guidelines.15 If 3 nitroglycerin tablets administered 5 minutes apart do not relieve angina, patients should seek emergency assistance (FIGURE 2).

Management of Angina in Patients Treated for Erectile Dysfunction

The PDE-5 inhibitors currently available in the United States (sildenafil, vardenafil, and tadalafil) have been demonstrated to be safe for most men with erectile dysfunction.16,17 However, deaths from coronary artery disease have occurred following sexual activity in a few men who have taken these drugs.18 Nitrate administration, presumably for coital angina, was implicated in approximately 20% of the deaths that occurred in patients who had received sildenafil.18 The nitrate-sildenafil combination was shown in 1 study to cause marked hypotension, even in healthy individuals.19 Hypotension resulting from this interaction may transform coital angina from a potentially reversible situation into an irreversible one. Although the actual frequency of marked hypotension resulting from the PDE-5 inhibitor–nitroglycerin combination is largely unknown for patients experiencing coital angina, the American College of Cardiology/American Heart Association recommendation to avoid nitrates for at least 24 hours after taking PDE-5 inhibitors2 is well advised.

Patients with coital angina who have taken a PDE-5 inhibitor before sexual activity should call for emergency assistance and transport to a hospital (FIGURE 2). Emergency medical technicians and physicians should be apprised of the history of PDE-5 inhibitor administration so that nitrates are not administered to these patients. Nonnitrate pharmacologic agents, such as β-blockers, calcium channel blockers, morphine, or aspirin, can be used.7

Acute cardiac events resulting from the nitrate–PDE-5 inhibitor interaction are infrequent. However, concern over this interaction often discourages physicians from prescribing a PDE-5 inhibitor. Consequently, many low-risk patients with ischemic heart disease who might benefit from PDE-5 inhibitors for erectile dysfunction are not receiving them. A strategy for the management of coital angina in patients who are receiving PDE-5 inhibitors may enhance the safety of these agents in clinical practice.

A policy of prompt emergency department visits for coital angina in patients who have taken these drugs is appropriate. Coital angina, especially in sedentary patients who were previously asymptomatic, may be a harbinger of disease progression requiring clinical reassessment. If the patient does not require immediate hospitalization, outpatient follow-up should be arranged. This affords an opportunity to reassess not only the anti-ischemic pharmacologic regimen, if any, of the patients but also their risk for subsequent acute coronary events.

Conclusion

Only about 5% of anginal attacks and less than 1% of MIs are brought on by sexual activity.8 In most cases, coital angina can be managed like any other angina. Phosphodiesterase-5 (PDE-5) inhibitor prior to sexual activity should avoid nitrates and call for emergency assistance. Patients who have not taken a PDE-5 inhibitor can take nitroglycerin according to American Heart Association guidelines.10 Patients whose coital angina persists despite nitroglycerin should call for emergency assistance.

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lines\textsuperscript{11} provide physicians with a useful framework for counseling these patients in regard to sexual activity.

REFERENCES