

Guidelines for the Management of Coronary Artery Disease (CAD)

Intervention Recommendations With Class of Recommendation and Level of Evidence

SMOKING:

Goal

Complete cessation.
No exposure to environmental tobacco smoke.

- Ask about tobacco use status at every visit. **I (B)**
- Advise every tobacco user to quit. **I (B)**
- Assess the tobacco user's willingness to quit. **I (B)**
- Assist by counseling and developing a plan for quitting. **I (B)**
- Arrange follow-up, referral to special programs, or pharmacotherapy (including nicotine replacement and bupropion). **I (B)**
- Urge avoidance of exposure to environmental tobacco smoke at work and home. **I (B)**

BLOOD PRESSURE CONTROL:

Goal

<140/90 mm Hg
or

<130/80 mm Hg if patient has diabetes or chronic kidney disease

- Initiate or maintain lifestyle modification—weight control; increased physical activity; alcohol moderation; sodium reduction; and emphasis on increased consumption of fresh fruits, vegetables, and low-fat dairy products. **I (B)**

For patients with blood pressure $\geq 140/90$ mm Hg (or $\geq 130/80$ mm Hg for individuals with chronic kidney disease or diabetes):

- As tolerated, add blood pressure medication, treating initially with β -blockers and/or ACE inhibitors, with addition of other drugs such as thiazides as needed to achieve goal blood pressure. **I (A)**

[For compelling indications for individual drug classes in specific vascular diseases, see Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7).]⁴

LIPID MANAGEMENT:

Goal

LDL-C <100 mg/dL
If triglycerides are ≥ 200 mg/dL, non-HDL-C should be <130 mg/dL

For all patients:

- Start dietary therapy. Reduce intake of saturated fats (to <7% of total calories), trans-fatty acids, and cholesterol (to <200 mg/d). **I (B)**
- Adding plant stanol/sterols (2 g/d) and viscous fiber (>10 g/d) will further lower LDL-C.
- Promote daily physical activity and weight management. **I (B)**
- Encourage increased consumption of omega-3 fatty acids in the form of fish[†] or in capsule form (1 g/d) for risk reduction. For treatment of elevated triglycerides, higher doses are usually necessary for risk reduction. **Ib (B)**

For lipid management:

Assess fasting lipid profile in all patients, and within 24 hours of hospitalization for those with an acute cardiovascular or coronary event. For hospitalized patients, initiate lipid-lowering medication as recommended below before discharge according to the following schedule:

- LDL-C should be <100 mg/dL **I (A)**, and
- Further reduction of LDL-C to <70 mg/dL is reasonable. **Ia (A)**
- If baseline LDL-C is ≥ 100 mg/dL, initiate LDL-lowering drug therapy.[‡] **I (A)**
- If on-treatment LDL-C is ≥ 100 mg/dL, intensify LDL-lowering drug therapy (may require LDL-lowering drug combination). **I (A)**
- If baseline LDL-C is 70 to 100 mg/dL, it is reasonable to treat to LDL-C <70 mg/dL. **Ia (B)**
- If triglycerides are 200 to 499 mg/dL, non-HDL-C should be <130 mg/dL. **I (B)**, and
- Further reduction of non-HDL-C to <100 mg/dL is reasonable. **Ia (B)**
- Therapeutic options to reduce non-HDL-C are:
 - ⇒ More intense LDL-C-lowering therapy **I (B)**, or
 - ⇒ Niacin[¶] (after LDL-C-lowering therapy) **Ia (B)**, or
 - ⇒ Fibrate therapy^{##} (after LDL-C-lowering therapy) **Ia (B)**
- If triglycerides are ≥ 500 mg/dL[#], therapeutic options to prevent pancreatitis are fibrate[¶] or niacin[¶] before LDL-lowering therapy; and treat LDL-C to goal after triglyceride-lowering therapy. Achieve non-HDL-C <130 mg/dL if possible. **I (C)**

PHYSICAL ACTIVITY:

Goal

30 minutes, 7 days per week (minimum 5 days per week)

- For all patients, assess risk with a physical activity history and/or an exercise test, to guide prescription. **I (B)**
- For all patients, encourage 30 to 60 minutes of moderate-intensity aerobic activity, such as brisk walking, on most, preferably all, days of the week, supplemented by an increase in daily lifestyle activities (eg, walking breaks at work, gardening, household work). **I (B)**
- Encourage resistance training 2 days per week. **Ib (C)**
- Advise medically supervised programs for high-risk patients (eg, recent acute coronary syndrome or revascularization, heart failure). **I (B)**

WEIGHT MANAGEMENT:

Goal

Body mass index: 18.5 to 24.9 kg/m²

Waist circumference: men <40 inches, women <35 inches

- Assess body mass index and/or waist circumference on each visit and consistently encourage weight maintenance/reduction through an appropriate balance of physical activity, caloric intake, and formal behavioral programs when indicated to maintain/achieve a body mass index between 18.5 and 24.9 kg/m². **I (B)**
- If waist circumference (measured horizontally at the iliac crest) is ≥ 35 inches in women and ≥ 40 inches in men, initiate lifestyle changes and consider treatment strategies for metabolic syndrome as indicated. **I (B)**
- The initial goal of weight loss therapy should be to reduce body weight by approximately 10% from baseline. With success, further weight loss can be attempted if indicated through further assessment. **I (B)**

DIABETES MANAGEMENT:

Goal

HbA_{1c} <7%

- Initiate lifestyle and pharmacotherapy to achieve near-normal HbA_{1c}. **I (B)**
- Begin vigorous modification of other risk factors (eg, physical activity, weight management, blood pressure control, and cholesterol management as recommended above). **I (B)**
- Coordinate diabetic care with patient's primary care physician or endocrinologist. **I (C)**

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ANTIPLATELET AGENTS/ANTICOAGULANTS:

- Start aspirin 75 to 162 mg/d and continue indefinitely in all patients unless contraindicated. **I (A)**

⇒ For patients undergoing coronary artery bypass grafting, aspirin should be started within 48 hours after surgery to reduce saphenous vein graft closure. Dosing regimens ranging from 100 to 325 mg/d appear to be efficacious. Doses higher than 162 mg/d can be continued for up to 1 year. **I (B)**

- Start and continue clopidogrel 75 mg/d in combination with aspirin for up to 12 months in patients after acute coronary syndrome or percutaneous coronary intervention with stent placement (≥1 month for bare metal stent, ≥3 months for sirolimus-eluting stent, and ≥6 months for paclitaxel-eluting stent). **I (B)**

⇒ Patients who have undergone percutaneous coronary intervention with stent placement should initially receive higher-dose aspirin at 325 mg/d for 1 month for bare metal stent, 3 months for sirolimus-eluting stent, and 6 months for paclitaxel-eluting stent. **I (B)**

- Manage warfarin to international normalized ratio=2.0 to 3.0 for paroxysmal or chronic atrial fibrillation or flutter, and in post-myocardial infarction patients when clinically indicated (eg, atrial fibrillation, left ventricular thrombus). **I (A)**
- Use of warfarin in conjunction with aspirin and/or clopidogrel is associated with increased risk of bleeding and should be monitored closely. **I (B)**

RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM BLOCKERS:

ACE inhibitors:

- Start and continue indefinitely in all patients with left ventricular ejection fraction ≤40% and in those with hypertension, diabetes, or chronic kidney disease, unless contraindicated. **I (A)**
- Consider for all other patients. **I (B)**
- Among lower-risk patients with normal left ventricular ejection fraction in whom cardiovascular risk factors are well controlled and revascularization has been performed, use of ACE inhibitors may be considered optional. **Ila (B)**

Angiotensin receptor blockers:

- Use in patients who are intolerant of ACE inhibitors and have heart failure or have had a myocardial infarction with left ventricular ejection fraction ≤40%. **I (A)**
- Consider in other patients who are ACE inhibitor intolerant. **I (B)**
- Consider use in combination with ACE inhibitors in systolic-dysfunction heart failure. **Iib (B)**

Aldosterone blockade:

- Use in post-myocardial infarction patients, without significant renal dysfunction[†] or hyperkalemia^{††}, who are already receiving therapeutic doses of an ACE inhibitor and β-blocker, have a left ventricular ejection fraction ≤40%, and have either diabetes or heart failure. **I (A)**

β-BLOCKERS:

- Start and continue indefinitely in all patients who have had myocardial infarction, acute coronary syndrome, or left ventricular dysfunction with or without heart failure symptoms, unless contraindicated. **I (A)**

Consider chronic therapy for all other patients with coronary or other vascular disease or diabetes unless contraindicated. **Ila (C)**

INFLUENZA VACCINATION:

Patients with cardiovascular disease should have an influenza vaccination. **I (B)**

* Patients covered by these guidelines include those with established coronary and other atherosclerotic vascular disease, including peripheral arterial disease, atherosclerotic aortic disease, and carotid artery disease. Treatment of patients whose only manifestation of cardiovascular risk is diabetes will be the topic of a separate AHA scientific statement. ACE indicates angiotensin-converting enzyme.

[†] Non-HDL-C=total cholesterol minus HDL-C.

[‡] Pregnant and lactating women should limit their intake of fish to minimize exposure to methylmercury.

[§] When LDL-lowering medications are used, obtain at least a 30% to 40% reduction in LDL-C levels. If LDL-C <70 mg/dL is the chosen target, consider drug titration to achieve this level to minimize side effects and cost. When LDL-C <70 mg/dL is not achievable because of high baseline LDL-C levels, it generally is possible to achieve reductions of >50% in LDL-C levels by either statins or LDL-C-lowering drug combinations.

^{||} Standard dose of statin with ezetimibe, bile acid sequestrant, or niacin.

[¶] The combination of high-dose statin+fibrate can increase risk for severe myopathy. Statin doses should be kept relatively low with this combination. Dietary supplement niacin must not be used as a substitute for prescription niacin.

[#] Patients with very high triglycerides should not consume alcohol. The use of bile acid sequestrant is relatively contraindicated when triglycerides are >200 mg/dL.

^{**} Creatinine should be <2.5 mg/dL in men and <2.0 mg/dL in women.

^{††} Potassium should be <5.0 mEq/L.