# CARDIOVASCULAR HEALTH

## I. Cardiovascular Disease

Cardiovascular disease is by far the leading cause of death among women in the United States; more women die from cardiovascular disease, predominantly heart attacks, congestive heart failure (CHF), and strokes.

### A. History

At the women's initial visit, a history of hypertension, treated or untreated; smoking, past or current; and family history of premature atherosclerosis (that is, a parent or sibling with heart attack or stroke before age 55 for men or 65 for women) should be obtained. Patients should be asked if they have been told of hypercholesterolemia.

- A history of glucose intolerance, whether treated or not, and symptoms of diabetes mellitus, such as polydipsia and polyuria, should be ascertained.
- Patients, especially patients who are middle-aged or older, must be asked about additional evidence of cardiac disease, such as chest discomfort, particularly when exertional in nature, dyspnea, syncope, known heart murmurs, and hospitalization for myocardial infarction (MI) or other heart disease.
- Patients should also be asked if they get any regular exercise as a prelude to exercise promotion.

### B. Physical Examination

- Recording of weight and blood pressure (BP) is appropriate at every visit.
- Xanthomas (cholesterol-filled nodules) may be found on the eyelids or extensor tendons of the extremities of patients with family hyperlipidemias.
- Funduscopic examination may reveal retinal arteriopathy in patients with hypertension or beading of the retinal artery in those with hypercholesterolemia.
- Auscultation of the chest for rales or diminished breath sounds due to pleural effusion may provide evidence of CHF.
- Cardiac examination should start with palpation of the chest to locate the point of maximum impulse (PMI), which should normally be in the midclavicular line of the fifth intercostals space. Lateralization of the PMI may indicate cardiomegaly.
- Palpation over the sternum identifies a right ventricular lift, characteristic of right heart dilatation and failure, which may be due to pulmonary disease, primary pulmonary hypertension, or intrinsic cardiac disease.

- During systematic auscultation of the heart, assess the splitting of S2 to screen for heretofore undetected atrial septal defects in which splitting of S2 is fixed rather than narrowing during expiration. An S4 may be heard in older patients or those with hypertension; an S3 may be normal in young patients but reflects left ventricular dysfunction in older patients. Murmurs, both innocent and pathologic, should be recorded.

- Examination of the abdomen may reveal hepatomegaly due to right heart failure or a pulsatile abdominal mass in patients with abdominal aortic aneurysms. Flank bruits may also be audible in those with renal artery stenosis.

- Peripheral edema may be evident in patients with CHF, and peripheral pulses should be checked to document the condition of the peripheral arteries.

## C. Laboratory Evaluation

Laboratory screening for cardiac risk factors should include a fasting glucose and lipid profile; that is, total cholesterol, triglycerides, high-density lipoprotein cholesterol (HDL-C), and calculated low-density lipoprotein cholesterol (LDL-C)

A 12-lead electrocardiogram (ECG) may be obtained as a baseline study for future reference or for prognosis. Detection of new abnormalities should trigger further evaluation for ischemic heart disease, such as electron beam computed tomography or exercise thallium testing.

## D. Hypertension

The national Health and Examination Survey estimated that 57.5 million United States residents were hypertensive. The incidence and severity of hypertension is greater among African-Americans than Caucasians at all ages after adolescence. Because most hypertensives are asymptomatic, blood-pressure screening should be undertaken at every opportunity.

**Classification of Blood Pressure**

| Category | Systolic Pressure (mmHg) | Diastolic Pressure (mmHg) | Follow-up Recommended |
|---|---|---|---|
| Optimal | <120 | <80 | |
| Normal | <130 | <85 | Recheck in 2 years |
| High-normal | 130 – 149 | 85 – 89 | Recheck in 1 year |
| Hypertension Stage 1 | 140 – 159 | 90 – 99 | Confirm within 2 months |
| Stage 2 | 160 – 179 | 100 – 109 | Refer or Rx within 1 month |
| Stage 3 | ≥180 | ≥110 | Refer or Rx immediately or within 1 week |
| **Note:** When systolic and diastolic pressure fall into different categories, the more severe category applies. | | | |

A number of studies have demonstrated increased cardiovascular risk in patients with mild hypertension, as well as the protective benefit conferred by antihypertensive therapy against strokes and probably CHF. In general, treatment of all patients with diastolic pressures > 100 mmHg, many with diastolic pressure of 95 to 100 mmHg, and some with a diastolic pressure of 90 to 95 mmHg, is indicated.

Treatment of isolated systolic hypertension, that is, systolic blood pressure >160 mmHg with diastolic pressure <90 mmHg, is indicated in the elderly, in whom the risk of stroke was reduced 36 percent by diuretic treatment in the Systolic Hypertension in the Elderly Program.

Following identification of hypertension, patients should be evaluated for underlying causes of hypertension such as renal failure, renal artery stenosis, coarctation of the aorta, endocrinopathies, and for end organ damage.

- When treating patients with hypertension, the objective is to achieve a sustained BP below 140/90 mmHg. Initial steps to lower BP include weight reduction and dietary sodium restriction. Recently, a high fruit, vegetable, and low-fat dairy diet, which was high in fiber, calcium, potassium, and magnesium was reported to reduce blood pressure. If lifestyle changes are ineffective, drug therapy should be instituted, usually with a single agent. Diuretics and β-adrenergic blockers have established efficacy in large clinical trials and are comparatively inexpensive. Calcium channel antagonists and angiotensin converting enzyme (ACE) inhibitors are reasonable alternatives. In diabetics, ACE inhibitors are preferred because of their renalprotective benefits. If adequate response has not been obtained after 1 to 3 months, the dose may be increased or a different agent tried. A second drug may be added if minimization of side effects by using lower doses of two drugs.

**Antihypertensive Medications**

| Drug | Trade Name | Side Effects |
|---|---|---|
| Diuretics | | |
| Clorthalidone | Hygroton | Hypokalemia, increase in uric acid |
| Furosemide | Lasix | |
| Hydrochlorothiazide | Microzide | |
| Bumetanide | Bumex | |
| Metolazone | Zaroxolyn | |
| β-Adrenergic blockers | | |
| *Nonselective* | | Bronchospasm, depression, bradycardia, masks hypoglycemia in diabetics |
| Propranalol | Inderal | |
| Nadolol | Corgard | |
| β-Selective | | Depression, bradycardia, masks hypoglycemia in diabetics |
| Metoprolol | Lopressor | |
| Atenolol | Tenormin | |
| Intrinsic sympathomimetic Activity | | Less bradycardia |
| Acebutolol | Sectral | |
| Pindolol | Visken | |
| α-β Blockers | | Orthostatic hypotension |
| Labetalol | Normodyne, Trandate | |
| Carvedilol | Coreg | |
| α-Receptor blockers | | |
| Prazosin | Minipress | Orthostatic hypotension |
| Doxazosin | Cardura | |
| Central α -antagoniss | | Sedation, withdrawal hypotension |
| Clonidine | Catapres | |
| α-Methyldopa | Aldomet | |
| Calcium channel blockers | | Bradycardia, ankle edema, constipation |
| Diltiazem | Cardizem, Tiazac, Dilacor | |
| Verapamil | Calan, Verelan, Covera, Isoptin | |
| Nifedipine, nicardipine, nisoldipine | Procardia, Adalat, Cardend, Sular | |
| Isradipine | DynaCirc | |
| Amlodipine | Norvasc | |
| Felodipine | Plendil | |
| Ace inhibitors | | Cough, hypotension, hyperkalemia, rise in creatinine, angioedema |
| Captopril | Capoten | |
| Enalapril | Vasotec | |
| Lisinopril | Prinivil, Zestril | |
| Benazepril | Lotensin | |
| Fosinopril | Monopril | |
| Ramipril | Altace | |
| Quinapril | Accupril | |
| Trandolapril | Mavik | |
| Angiotensin II receptor blockers | | Hyperkalemia |
| Losartin | Cozaar | |
| Valsartan | Diovan | |
| Direct vasodilators | | |
| Hydralazine | | Fluid retention, reflex tachycardia |
| Minoxidil | | |

ACE inhibitors = Angiotensin-converting enzyme inhibitors.

Patients with hypertensive emergencies have acute end organ sequelae of hypertension, such as encephalopathy, acute heart failure with pulmonary edema, or dissecting aortic aneurysm. These situations require prompt hospitalization for parenteral antihypertensive therapy.

## E. Diabetes Mellitus

Diabetes is clearly associated with increased risk of cardiovascular disease; mortality from coronary disease among diabetics is twice that of non-diabetics. Diabetics should be identified and receive aggressive weight control, dietary education, and, in many instances, drug therapy.

## F. Hyperlipidemia

The prevalence of hypercholesterolemia has fallen in recent years; however, the prevalence of elevated (>240 mg/dl) or borderline (200 to 239 mg/dl) total cholesterol among women is still estimated at 20 and 30 percent, respectively.

- Hyperlipidemia usually causes no symptoms until coronary, cerebral, or peripheral vascular insufficiency develops. Diagnosis is usually made through blood screening. The lipid profile generally includes total cholesterol, triglycerides, HDL-cholesterol, and calculated LDL-cholesterol.

- Patients with desirable cholesterol levels should have them repeated at 5 year intervals. Fasting lipid profiles should be obtained for those with borderline cholesterol levels.

- Patients with undesirable total or LDL-cholesterol levels should receive lipid-lowering management, including education in weight reduction, exercise, and the NCEP "Step One" diet. After 2 to 3 months of dietary therapy, the fasting lipid profile should be repeated. If lipids are still above the desirable range, drug therapy is indicated.

- A wide range of cholesterol-lowering drugs are available, including niacin, resin agents (cholestyramine, colestipol), and HMG-CoA reductase inhibitors (atorvastatin, lovastatin, simvastatin, pravastatin, cerivastatin, fluvastatin).

**National Cholesterol Education Program Dietary Recommendation**

| | **Step One Diet** | **Step Two Diet** |
|---|---|---|
| **Total fat** | <30% of total calories | <30% of total calories |
| Saturated fatty acids | <10% of total calories | <7% of total calories |
| Polyunsaturated fatty acids | Up to 10% of total calories | Up to 10% of total calories |
| Monounsaturated fatty acids | 10 – 15% of total calories | 10-15% of total calories |
| **Carbohydrates** | 50-60% of total calories | 50-60% of total calories |
| **Protein** | 10-20% of total calories | 10-20% of total calories |
| **Cholesterol** | <300 mg/day | <200 mg/day |
| **Total calories** | To achieve and maintain desirable weight | To achieve and maintain desirable weight |

## G. Cigarette Smoking

Cigarette smoking is the foremost preventable factor associated with coronary death in the United States. The risk of coronary disease among smokers is twice that of nonsmokers; cardiac risk is directly related to the number of cigarettes smoked each day. Secondary exposure to cigarette smoke through passive inhalation by nonsmokers increases risk as well.

## H. Exercise

Physical activity reduces cardiovascular risk, lowers BP, improves glucose tolerance, assists with maintenance of ideal body weight, and improves the lipid profile.

## I. Aspirin

In the Physician's Health Study, aspirin, 325 mg every other day, provided cardiovascular protection in middle-aged and older men. On an individualized basis, physicians may choose to recommend aspirin for women with cardiac risk factors.

## J. Exogenous Hormone Replacement

Long-term follow-up of oral contraceptive users has indicated no increased risk of cardiovascular disease from oral contraceptive use.

# II Evaluation of Signs and Symptoms during Routine Office Visits

Women are less likely than men to seek medical attention for potential cardiac complaints and they are less likely to be referred for diagnostic testing once they do seek medical attention, despite the fact that cardiovascular mortality in older women actually exceeds that in men of the same age.

## A. Chest Pain

Chest pain is a common complaint. The quality, location, and duration of chest discomfort should be elicited, along with precipitants and factors providing relief. Greater age and the presence of cardiac risk factors should increase one' suspicion of coronary disease.

Angina pectoris rather than MI was the predominant presenting symptom for women with coronary heart disease. Classic angina is characterized as substernal heaviness or pressure radiating to the neck, left arm, or jay and lasting minutes; it is brought on by exercise and relieved by rest.

For treatment of angina and/or hypertension, Amlodipine is very effective with a starting dose of 5 mg/day, increased to 10 mg/day as tolerated. Long-acting Diltiazem is another reasonable alternative, particularly well-tolerated in older patients, with a starting dose of

120 mg/day of the sustained-release formation, increased to 240 mg/day as needed. Caution is warranted when prescribing the combination of diltiazem with a β-blocker, as excessive bradycardia may ensue.

***Nitrates*** are predominant venodilators and have been the mainstay of antianginal therapy since the nineteenth century. Acute anginal episodes are treated with sublingual nitroglycerin 0.3 mg, repeated if necessary.

## B. Dyspnea

Dyspnea can be attributed to a wide variety of causes.

***Congestive heart failure*** (CHF) is defined as cardiac function inadequate to meet the metabolic needs of peripheral tissues, most commonly because of valvular disease or ventricular dysfunction. Dyspnea, either exertional or at rest, cough, orthopnea, paroxysmal nocturnal dyspnea requiring a patient to arise from bed to aid breathing, and peripheral edema are characteristic symptoms in CHF. Physical findings may include tachycardia, hypotension, jugular venous distension, hepatojugular reflux, hepatomegaly, rales, pleural effusion, an S# gallop, and peripheral edema.

## C. Palpitations

***Palpitations*** are described as skipped beats, pounding, or racing of the heart. They may represent paroxysmal atrial tachycardia or any other type of tachycardia, premature atrial or ventricular beats, atrial fibrillation, compensatory or sinus pauses, sudden onset of sinus bradycardia, or complete heart block, or may not be associated with any rhythm disturbance at all.

- In evaluating patients with palpitations, previous cardiac history including MVP and MI should be obtained and questions should be asked regarding any symptoms suggesting thyrotoxicosis. Physical examination may reveal evidence of MVP, that is a midsystolic click with or without a holosystolic murmur.

## D. Syncope

***Syncope*** is loss of consciousness, usually due to inadequate cerebral perfusion. Syncope may be caused by:

- Vasomotor instability
- Drug effects
- Cerebrovascular disease
- Cardiac outflow obstruction
- Brady-or tachyarrhythmias

In obtaining a history from patients with syncope, a description of events leading up to the syncopal episode, concurrent symptoms, drug regimen, past MI, valvular disease, and past cardiac evaluation may be helpful. Physical examination should include measurement of

supine and upright pulse and blood pressure. Attention should be given to signs of aortic stenosis or hypertrophic cardiomyopathy (systolic ejection murmur that gets softer with squatting and louder with upright posture). Electrocardiography may reveal evidence of prior MI, conduction abnormalities, or left ventricular hypertrophy (which may indicate aortic stenosis or hypertrophic cardiomyopathy).

## C. Claudication

Most leg cramps are not claudication, yet claudication is important to identify, in part because of its close association with CAD. Of patients with peripheral vascular disease but no symptoms referable to the heart, half will have coronary disease and all should be evaluated for this possibility. *Claudication* is the peripheral vascular equivalent of angina, characterized as crampy pain in the buttocks, posterior thigh, or calf, brought on by exertion and relieved by rest. Cardiovascular risk factors, particularly smoking, should be carefully assessed. Physical exam should include palpation of femoral, popliteal, dorsalis pedis, and posterior tibialis pulses bilaterally. Ischemic foot ulcers may be apparent. Initial management is conservative with good control of hypertension, diabetes, and hyperlipidemia. Patients must stop smoking. Modest exercise training is sometimes helpful, enabling muscles to make efficient use of the available blood supply. If patients have pain at rest or persistent claudication after a trial of conservative management, they should be referred to a vascular surgeon.

## F. Peripheral Venous Disease

***Venous thrombophlebitis*** is prevalent following gynecological surgery.

- Clearly, prophylaxis against deep venous thrombosis or pulmonary embolism is preferable to treatment after the problem has arisen. Prophylaxis regimens include compression stockings, low-dose warfarin, or intravenous or subcutaneous heparin.

- Characteristic physical findings of deep venous thrombosis include localized warmth, redness, tenderness, and swelling of the extremity. Tenderness over the femoral veins is more suggestive of proximal venous thrombosis.

- Patients should be treated with either intravenous or subcutaneous heparin. Anticoagulation should be transitioned to warfarin and maintained for at least 3 months. Pregnant women who cannot take warfarin may be transitioned to subcutaneous heparin.

Calf vein thrombosis is generally associated with a good prognosis even when treated conservatively. However, over 10 to 14 days, about 6 percent of affected individuals develop abnormal impedance plethysmographic studies, indicating extension into the popliteal vein. Therefore, either conventional anticoagulation with heparin and warfarin or serial noninvasive evaluation for 10 to 14 days is recommended.

Superficial phlebitis can be managed conservatively with analgesics or anti-inflammatory agents, heat, and elevation.

## G. Aortic Disease

Aortic disease is generally structural, because the aorta predominantly functions as a conduit from the left ventricle to end organs. Structural aortic disease can be categorized as congenital or acquired.

Coarctation of the aorta is a congenital malformation associated with bicuspid aortic valve with Turner's syndrome. Coarctation is usually identified during childhood. The presence and severity of the coarctation and any associated anomalies can be readily confirmed by echocardiography, and the aorta either dilated by balloon angioplasty or surgically repaired.

The other comparatively common group of congenital diseases with aortic manifestations is connective tissue disease, such as Ehlers-Danlos and Marfan syndromes. In Ehlers-Danlos syndrome, echocardiography for detection of associated mitral valve prolapse and appropriate antibiotic prophylaxis usually suffice. Mitral valve prolapse is also common in Marfan syndrome. In addition to echocardiography for mitral valve evaluation, all patients with Marfan syndrome should have serial echocardiographic follow-up of their aortic root dimension and should be seen periodically by a cardiologist. Prophylactic aortic surgery is usually carried out to prevent rupture once the aorta reaches 60 mm in diameter. Aortic dissection is a prominent cause of death in patients with Marfan syndrome. Further, the risk of aortic rupture or dissection is augmented by pregnancy.

The two most common acquired structural abnormalities of the aorta are aortic aneurysm and dissection. Although the differential diagnosis of thoracic or abdominal aortic aneurysm is extensive, most cases are due to atherosclerosis. Abdominal aortic aneurysms are usually detected as asymptomatic, pulsatile abdominal masses. Aneurysm size is readily quantified by abdominal ultrasound, and surgical repair recommended for aneurysms exceeding 6 cm in diameter.

Thoracic aneurysms are more frequently symptomatic due to compression of intrathoracic structures, leading to cough, hoarseness, stridor, hemoptysis, and obstructive pneumonia. Diagnosis of thoracic aneurysms may be confirmed by MRI, CT scan, or transesophageal echocardiography. Surgical repair is recommended for thoracic aneurysms producing symptoms or for asymptomatic aneurysms exceeding 7 cm in diameter because of the risk of rupture.

Aortic dissection is a dramatic event, presenting with severe, knifelike back or chest pain, hypotension, and, at times, a sensation of impending doom. Aortic dissection is caused by a tear in the intima or hemorrhage into the media with immediate propagation of the dissection along the vessel wall. Upper extremity pulses may be sent, and congestive heart failure may result from acute aortic insufficiency. When aortic dissection is suspected, the patient should urgently be transported to an emergency room for diagnosis and management.

## H. Myocarditis, Pericarditis, and Endocarditis

Dilated cardiomyopathy can present as new-on-set congestive heart failure or with atrial or ventricular arrhythmias. In contrast to idiopathic cardiomyopathy, patients with myocarditis often recover. Congestive heart failure and arrhythmias in myocarditis are responsive to conventional treatment.

Pericarditis usually presents a substernal or left precordial chest pain, often relieved by leaning forward and exacerbated by cough, deep inspiration, or supine posture. A pericardial friction rub may be audible. Pericarditis may be idiopathic, infectious, malignant, uremic, or associated with collagen vascular diseases such as systemic lupus erythematosus or rheumatoid arthritis. Idopathic percarditis, a self-limited disease, is treated with non-steroidal anti-inflammatory agents. Patients with bacterial, tuberculous, or fungal Pericarditis are acutely ill, and require prompt diagnosis, pericardial drainage, and specific antibiotic therapy. Malignant effusions occur most commonly in patients with known breast or lung cancer, lymphoma, or melanoma.

Pericarditis due to any etiology may result in pericardial tamponade. Patients with tamponade are severely dyspneic, with tachycardia, jugular venous distension, and an elevated pulsus paradoxicus; they may be hypotensive. Characteristic echocardiographic findings confirm the diagnosis of pericardial tamponade, which may be relieved by either percutaneous or open pericardial drainage.

Bacterial endocarditis is an infection of a native or prosthetic heart valve, usually with characteristic organisms such a staphylococci, streptococci, or enterococci. Patients commonly present with fever and a new heart murmur. Individuals with a structural heart abnormality, such as mitral valve prolapse or ventricular septal defect have increased susceptibility to endocarditis.

The responsible pathogen is identified by blood culture; vegetations and paravalvular abscesses may be identified by echocardiography. Antibiotic therapy is tailored to the specific organism.

## I. Summary

Cardiovascular disease is widespread, yet underdiagnosed and undertreated in women in the United States. A woman’s primary care physician should use the opportunity of the office visit to screen for and identify cardiovascular risk factors and either treat or refer the woman with cardiovascular disease.