

# Case Study: A 52-Year-Old Woman With Hypertension and Diabetes Who Presents With Chest Pain

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## PRESENTATION

L.R. is a 52-year-old Caucasian woman with a known history of prehypertension, dyslipidemia, and type 2 diabetes. She presented to the office 6 months ago to get established. She had no complaints at that time. Her review of systems was negative except for some occasional fatigue. She smoked cigarettes as a teenager and young adult but quit 25 years ago. Her family history was positive for hypertension, type 2 diabetes, and myocardial infarction (MI) (father at age 62 and mother at age 68).

Her examination revealed a healthy appearing woman with height of 5'4" and weight of 168 lb (BMI of 28.8 kg/m<sup>2</sup>). Her blood pressure was 138/88 mmHg. Initial laboratory evaluation revealed a random glucose of 180 mg/dl, triglycerides of 185 mg/dl, total cholesterol of 225 mg/dl, HDL cholesterol of 52 mg/dl, LDL cholesterol of 132 mg/dl, and hemoglobin A<sub>1c</sub> (A1C) of 7.6%. She was on a sulfonylurea and metformin twice daily for her diabetes and atorvastatin daily for her dyslipidemia. She was instructed about starting a daily exercise program and agreed to a weight loss program.

She seemed to be doing well until she presented to the emergency room complaining of shortness of breathe and palpitations. On admission, she had elevated blood pressures in the range of 138–146 mmHg systolic and 86–90 mmHg diastolic. Her evaluation was negative, with normal electrocardiograms and cardiac enzymes. She was discharged the next morning on her same diabetes and cholesterol medications. A diuretic was added for her blood

pressure. She was asked to follow up in the office in 1 week. At the 1-week follow-up visit, her examination revealed a weight of 175 lb (BMI 30.0 kg/m<sup>2</sup>) and blood pressure of 132/86 mmHg. She admitted to not exercising and not being serious about her weight loss program. Her 10-year coronary heart disease risk was calculated and noted to be 11%, with an average risk for her age of 8% (low risk for her age would be 5%), giving her a relative risk of 2.2.

She was referred for a medical nutrition therapy consultation for dietary modification. She promised to start a brisk walking program each evening for 30 minutes. She was scheduled for an exercise treadmill test and asked to return to the office for follow-up in 6 weeks.

## QUESTIONS

1. What are the present American Heart Association (AHA) recommendations for this patient's management now?
2. Where are the recommendations according to the Framingham Global Risk Model?
3. What tests should now be ordered?
4. What medications or supplements are recommended and not recommended for primary or secondary prevention of cardiovascular disease (CVD)?

## COMMENTARY

In the United States, > 9 million women > 20 years of age have type 1 or type 2 diabetes, with ~ 90–95% of all diagnosed cases having type 2 diabetes.<sup>1</sup> CVD is the largest single cause of death among women worldwide. In the United States, more women than men die of

CVD annually.<sup>2</sup> Unfortunately, 36% of women do not perceive themselves to be at risk, and this has underscored the need for a special area of focus on CVD and its prevention in women.

Chest pain is the most common presenting symptom of MI in both men and women, but women are less likely to present with typical anginal symptoms. In a study of 515 women with acute MI, chest pain was absent in 43% of the patients, and when the women did experience chest pain, it was described as pressure (21.9%), ache (15%), or tightness (14%).<sup>3</sup> Women with atypical symptoms (e.g., back pain, nausea, indigestion, dyspnea, or fatigue) may be at a disadvantage because these symptoms are often ignored and can lead to a delayed presentation and diagnosis.

Recent AHA guidelines urge women to start an early adoption of a healthy lifestyle with new target goals for risk assessment.<sup>2</sup> After a diagnosis of diabetes, adult women have heart disease present at two to four times higher rates than those without diabetes.<sup>4</sup> With this in mind, the focus is on prevention.

Initial CVD risk evaluation (history, physical examination, and fasting blood glucose and lipid testing) and Framingham risk assessment are recommended in all women > 20 years of age.

Mosca et al.<sup>5</sup> discuss a new Framingham Global Risk Model composed of three categories (high risk, at risk, and optimal risk) instead of the previous four categories (high, intermediate, lower, and optimal), decreasing the limitations of the previous risk model and allowing for determination of a women's

lifetime risk, diversity, and stroke risk (Figure 1).<sup>5</sup> The criteria for high risk are coronary artery disease, cerebral vascular disease (CVD), peripheral arterial occlusive disease, abdominal aortic aneurysm, end-stage or chronic renal disease, and diabetes and provide a global risk score of > 20%. Individuals with an estimated 10-year risk > 20% may require aggressive interventions.

At-risk individuals have one or more of the following major CVD risk factors: smoking, poor diet, physical inactivity, obesity, family history of premature CVD, hypertension, dyslipidemia, metabolic syndrome, and poor exercise capacity on treadmill testing. It should be noted that exercise testing in patients with diabetes is given a IIb classification by the AHA and the American College of Cardiology. This classification states that “usefulness or efficacy is less well established by evidence or opinion.” The guideline also stated that exercise treadmill testing in general “might be useful in people with heightened pretest risk.”<sup>6,7</sup> Other tests to consider include high-sensitivity C-reactive protein (CRP), electron-beam computed tomography, measurement of ankle-brachial index, and ultrasound to measure carotid intima-media thickness.<sup>8,9</sup> Data suggest that the CRP level is a stronger predictor of cardiovascular events than the LDL cholesterol level and that it adds prognostic information to that conveyed by the Framingham risk score.<sup>10</sup>

The criteria for optimal risk (global risk score < 10%) demonstrate a healthy lifestyle that should indicate conservative management focusing on maintaining appropriate lifestyle interventions.

Lifestyle recommendations of smoking cessation, a heart-healthy diet (rich in vegetables, whole grains, and oily fish), daily exercise, and weight management are indicated for all women > 20 years of age (AHA evidence Class I).

Patients with diabetes should be encouraged to perform 30–60 minutes of moderate-intensity aerobic activity, such as brisk walking, on most (preferably all)

days of the week. Lifestyle and pharmacotherapy should be used as indicated in women with diabetes (AHA evidence Class I Level B) to achieve an A1C < 7% if this can be accomplished without significant hypoglycemia (AHA evidence Class I Level C). For women > 65 years of age, 81 mg of aspirin daily is recommended if blood pressure is controlled. Clopidogrel should be considered for individuals who cannot take aspirin. In addition, all high-risk women need blood pressure control (AHA evidence Class I) and to take an aspirin each day (AHA evidence Class Ia) or clopidogrel (AHA evidence Class Ib).<sup>5</sup>

Before initiating a vigorous exercise program, individuals with diabetes should be assessed for conditions that might contraindicate certain types of exercise or predispose to injury. However, because no randomized trials or large cohort studies have evaluated the utility of exercise stress testing specifically in people with diabetes, the decision to perform stress testing for patients beginning a vigorous exercise program must be made on an individual basis. Research has shown that low exercise capacity may be an independent predictor of death in women.<sup>11,12</sup> Interpreting the level of exercise achieved with regard to age-predicted values of exercise capacity in women may provide additional prognostic information for risk stratification.<sup>13</sup>

Consensus from the AHA clarifies how to use aspirin, vitamins, and supplements to prevent heart disease in women. Women should not receive hormone therapy or estrogen modulators, antioxidant vitamin supplements (vitamins A, E, C, and beta-carotene), or folic acid or use aspirin routinely (in healthy women < 65 years of age) for primary or secondary prevention.<sup>5</sup>

Vitamin A, beta-carotene, and high-dose vitamin E may increase cardiovascular mortality. Although high-dose folic acid may decrease homocysteine levels, it is not recommended to prevent heart disease. There has not been any evidence

to show this approach improves patient outcomes. However, there is good evidence supporting the use of omega-3 fatty acids, which should be taken daily (1 g/day).<sup>5</sup>

Major risk factor interventions include achieving an optimal blood pressure of < 120/80 mmHg, LDL cholesterol levels < 100 mg/dl (except for those at high risk, who should achieve an LDL < 70 mg/dl), HDL cholesterol levels > 50 mg/dl, triglycerides < 150 mg/dl, and A1C levels < 7% or as close to normal (< 6%) as possible without causing significant hypoglycemia if diabetes is present.<sup>4</sup> These recommendations are based on epidemiological studies that suggest that each 1% increase in A1C is associated with a 15 and 18% increase in the relative risk of CVD for patients with type 1 and type 2 diabetes, respectively.<sup>14</sup>

The National Heart, Lung, and Blood Institute Adult Treatment Panel III designated diabetes as a CVD risk equivalent for setting treatment goals for LDL cholesterol.<sup>15</sup> The presence of type 2 diabetes places individuals at increased risk of an MI within a 10-year period. (Patients with diabetes are at high risk for future CVD events, and their absolute risk for future events is very high.) Even in the absence of CVD, both the American Diabetes Association (ADA) and the AHA identify diabetes as a high-risk condition for macrovascular CVD.<sup>16</sup>

In patients with type 2 diabetes and other risk factors, statin therapy has been clearly shown to reduce cardiovascular risk (22–24% relative risk reduction in both primary and secondary cardiovascular prevention studies).<sup>17</sup> The ADA recommends that individuals > 40 years of age with type 2 diabetes should be treated with a statin in doses high enough to lower LDL cholesterol levels by 30–40%, regardless of baseline LDL cholesterol. LDL-lowering drugs should be used simultaneously with lifestyle therapy in women with coronary heart disease to achieve an LDL < 100 mg/dl (AHA evidence Class I Level A) and similarly in

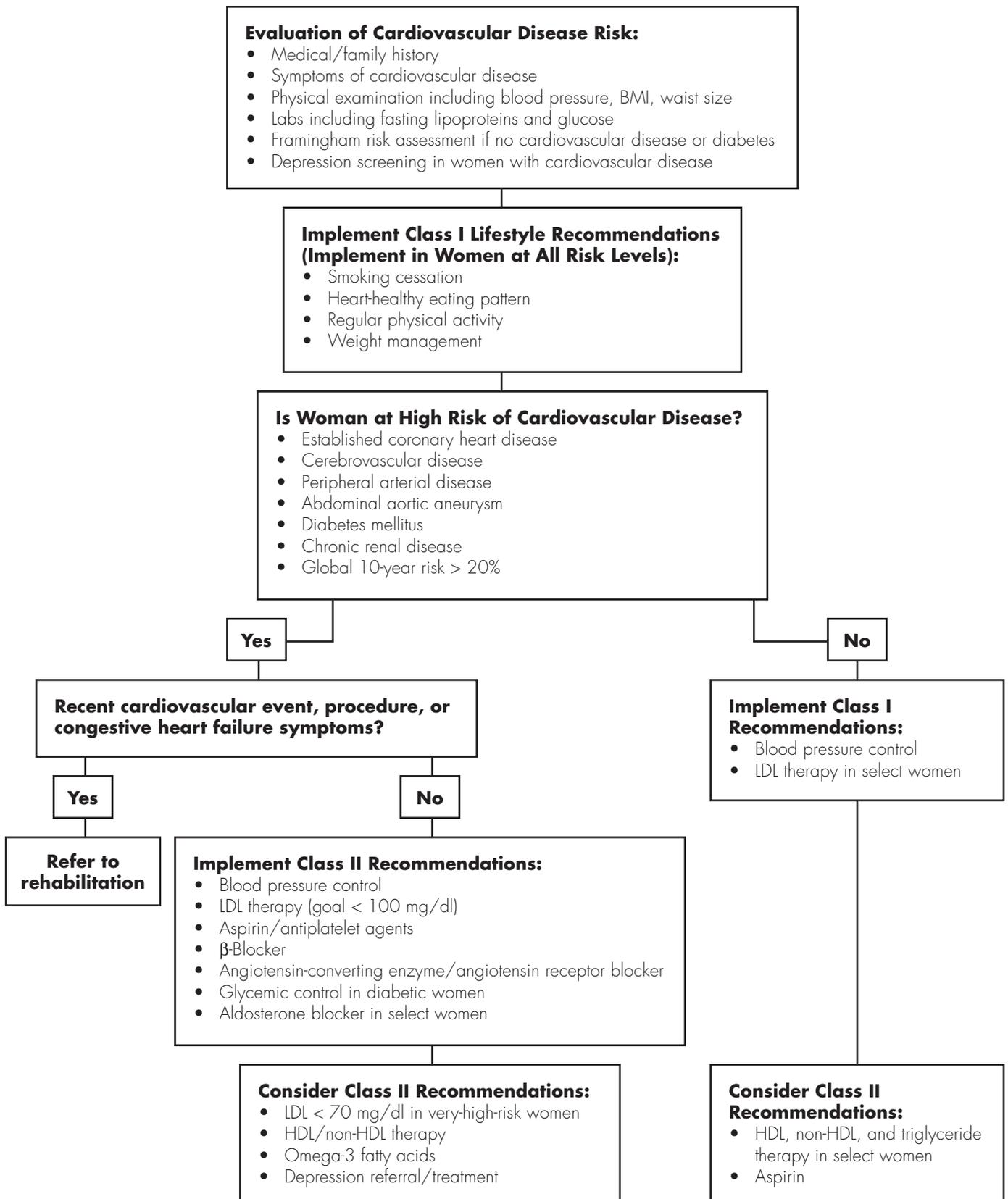


Figure 1. Cardiovascular risk assessment and management<sup>5</sup>

women with other atherosclerotic CVD or diabetes or 10-year absolute risk > 20% (AHA evidence Class I Level B). A reduction to < 70 mg/dl is reasonable in very-high-risk women with coronary heart disease and may require an LDL-lowering drug combination (AHA evidence Class IIa Level B).<sup>5</sup>

**CLINICAL PEARLS**

- Women may present with either typical (chest pain) or atypical (back pain, nausea, indigestion, dyspnea, fatigue) symptoms of an MI.
- Initial CVD risk evaluation (history, physical examination, and fasting blood glucose and lipid testing) and Framingham risk assessment are recommended in all women > 20 years of age.
- Lifestyle recommendations of smoking cessation, heart-healthy diet (rich in vegetables, whole grains, and oily fish), daily exercise, and weight management are indicated for all women > 20 years of age.
- Women should not receive hormone therapy or estrogen modulators, antioxidant vitamin supplements (vitamins A, E, C, and beta-carotene) or folic acid, or use aspirin routinely (in healthy women < 65 years of age) for primary or secondary prevention.<sup>5</sup>
- The ADA recommends that individuals > 40 years of age with type 2 diabetes be treated with a statin in doses high enough to lower LDL cholesterol levels by 30–40% regardless of baseline LDL cholesterol.

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