

# For Clinicians

## Reducing Cardiovascular Risk in Patients With Type 2 Diabetes Mellitus



Cardiovascular disease (CVD) is the most common complication of type 2 diabetes mellitus (T2DM), and approximately 50% of patients with T2DM will die of cardiovascular (CV) causes, including myocardial infarction (MI), stroke, peripheral vascular disease, and congestive heart failure.<sup>1</sup> The CV risk is multifactorial and complicated by hypertension (HTN) and dyslipidemia, both of which are highly prevalent among patients with T2DM.<sup>2</sup> Taken together, hyperglycemia, HTN, and dyslipidemia are metabolic abnormalities that double the risk for adverse CV events and death compared with otherwise healthy individuals.<sup>3,4</sup> For patients with hyperglycemia, the risk for CVD parallels increases in glycosylated hemoglobin (A1C), even in individuals without a clinical diagnosis of T2DM or a history of CVD.<sup>5,6</sup> Dyslipidemia in patients with T2DM correlates closely with the risk for MI.<sup>7</sup> Similarly, there is a linear relationship between increased blood pressure (BP) levels and increased CV risk.<sup>8</sup>

### THE LINKS BETWEEN DIABETES AND CARDIOVASCULAR DISEASE

Insulin resistance in T2DM increases levels of triglycerides (TG), the atherogenic, small dense particles of low-density lipoprotein (LDL), and apolipoprotein B (ApoB), and promotes renal excretion of high-density lipoprotein (HDL).<sup>9</sup> As a result, patients with T2DM often have a dyslipidemic profile—elevated plasma levels of TG, a high number of ApoB particles, and low levels of HDL—

cholesterol—that promotes atherosclerosis.<sup>7,9</sup> By contrast, low total cholesterol (<150 mg/dL) and LDL-cholesterol ( $\leq$ 70 mg/dL) levels are associated with a low incidence of coronary heart disease (CHD), and the incidence of CV events decreases as plasma cholesterol levels decrease.<sup>10,11</sup> Lowering cholesterol levels with statin treatment reduces the risk for major coronary events, including nonfatal MI and CHD death and ischemic stroke.<sup>12</sup>

Hyperglycemia adversely affects the circulatory system by increasing sympathetic tone and promoting fluid retention, which accelerates atherosclerotic changes in large vessels, causes thinning and obliterative changes in small vessels, and increases cardiac workload.<sup>2</sup> Reducing BP levels by only 20 mm Hg systolic and 10 mm diastolic can reduce CV risk by 50%.<sup>8</sup> More aggressive BP lowering has been shown to reduce major CV events, diabetes-related mortality, and stroke.<sup>13,14</sup>

### HELPING PATIENTS MAINTAIN METABOLIC CONTROL TO REDUCE CARDIOVASCULAR RISK

In addition to achieving and maintaining glycemic control, correcting dyslipidemia and HTN are important components in the management of patients with T2DM. The targets for A1C, preprandial and postprandial glucose levels, BP, and lipids recommended by the American Diabetes Association (ADA) are shown in the **Table**.<sup>15</sup> The ADA recommends obtaining an A1C at least twice a year in

patients who are meeting treatment goals and have stable glycemic control, and at least quarterly in patients for whom therapy has changed or who are not meeting glycemic goals.<sup>15</sup>

BP should be measured at every routine diabetes visit.<sup>16</sup> Patients with minimally elevated BP (130–139/80–89 mm Hg) respond to lifestyle interventions, but if targets are not achieved after 3 months, pharmacologic therapy should be initiated.<sup>15</sup>

A fasting lipid profile should be assessed at least once a year for most patients with T2DM.<sup>16</sup> Lifestyle modification is recommended to improve the lipid profile, and patients with overt CVD or without CVD over 40 years of age should also receive statin therapy.<sup>15</sup> Statin therapy should also be considered in patients without overt CVD who have multiple CVD risk factors.<sup>15</sup>

**TABLE. ADA-recommended Metabolic Targets to Reduce Cardiovascular Risk in Type 2 Diabetes**

<b>Glycemic Targets</b>	
A1C	<7%*
Preprandial plasma glucose	70-130 mg/dL
Peak postprandial glucose	<180 mg/dL
<b>Blood Pressure Target</b>	
<140/80 mm Hg	
<b>Lipid Targets</b>	
LDL-C	<100 mg/dL if no evidence of CVD
HDL-C	<70 mg/dL if evidence of CVD >40 mg/dL (men); >50 mg/dL (women)
Triglycerides	<150 mg/dL
<p>*A tighter glycemic goal (&lt;6.5% A1C) may be appropriate for patients with a short duration of disease, longer life expectancy, and few comorbidities, if this can be achieved without significant treatment-related hypoglycemia or other adverse effects. For patients with a history of severe hypoglycemia, numerous comorbidities, advanced macrovascular or microvascular complications, and limited life expectancy, a less stringent goal (&gt;8.0%) may be appropriate.</p> <p>A1C = glycosylated hemoglobin; ADA = American Diabetes Association; LDL-C = low-density lipoprotein cholesterol; HDL-C = high-density lipoprotein cholesterol; CVD = cardiovascular disease.</p> <p>American Diabetes Association. <i>Diabetes Care</i>. 2012;35(suppl 1):S11-S63.</p>	

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