Diabetes and Dyslipidemia In Women

Presented by:
Natasha Mitchell, PharmD, RPh

Disclosure
I do not have a vested interest in or affiliation with any corporate organization offering financial support or grant money for this continuing education program, or any affiliation with an organization whose philosophy could potentially bias my presentation.

Objectives
Upon completion of the CE presentation the pharmacy
1. Summarize the specific epidemiological characteristics of diabetes and dyslipidemia among women.
2. List the modifiable and non-modifiable risk factors associated with diabetes and dyslipidemia in women.
3. Match commonly used drugs to treat diabetes and dyslipidemia with the commonly associated side effects.
What is diabetes?

- A disease in which the body's ability to produce or respond to the hormone insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in the blood and urine.

Diabetes by the Numbers

A Snapshot - Diabetes in the United States

30.3 million people in the U.S.

84.1 million people have prediabetes.

9 million people are under 20 years old.
Classification of Diabetes: Type 1

- Develops at any age, but most cases are diagnosed before the age of 30 years
- Affected individuals experience significant weight loss, and signs of hyperglycemia which appear abruptly
- Dependent on exogenous insulin to prevent ketoacidosis and sustain life
- Coma and death can result from delayed diagnosis and/or treatment
Classification of Diabetes: Type 2

- Approximately 90% of patients with diabetes have this type with disproportionate representation among the elderly and certain ethnic populations.
- Usually diagnosed in the 3rd or 4th decade of life.
- Frequently asymptomatic at the time of diagnosis, but as many as 20% present with evidence of end organ damage.
- Approximately 80% are obese at time of diagnosis.

Gestational diabetes

- 2%-10% of pregnant women will develop gestational diabetes
  - Likely rate will be higher when using new diagnostic criteria
  - Women are much more likely to get type 2 diabetes later if they have gestational diabetes
    - 5%-10% immediately after pregnancy
    - 35%-60% within 10-20 years

What is gestational diabetes?

- Gestational diabetes mellitus (GDM) is the most common problem of pregnancy.
- It affects about 4 percent of all pregnancies.
- GDM occurs when the blood sugar (glucose) is higher than normal during pregnancy.
Assessment

Which of the following statements are true concerning Diabetes?

A. 33.3 million people in the U.S. have diabetes
B. Patient with Type 1 diabetes often experience weight loss
C. Women of experience gestational diabetes are at higher risk for developing Type 1 diabetes than the other women who do not have diabetes
D. All of the above

Pathophysiology of Type 1 Diabetes

Pancreas → Hyperglycemia

Main Pathophysiological Defects in T2DM

HYPERGLYCEMIA
Assessment

Patients with type 1 have an inability to produce insulin.

A. True  
B. False

Diagnosis

- No fasting needed
- No caloric intake for at least 8 hours
- Glucose tolerance test: 120 mg/dL (11:10 a.m. draw)
- Random blood sugar: 200 mg/dL (11:10 a.m. draw)

What is A1C?

- Glucose attaching to the hemoglobin of the RBC
- Longer hemoglobin occurs in the blood → more glucose attaches to the RBC → higher A1C
- A1C is a weighted average of glucose levels during the life of the RBC (120 days).
Assessment
- What diagnosis should a patient with an A1c of 6.6% have:
  A. Diabetes  
  B. Pre-Diabetes  
  C. Impaired Fasting Glucose  
  D. None of the above

Glycemic Recommendations for Nonpregnant Adults with Diabetes (2)
- Goals should be individualized based on:
  - Duration of diabetes  
  - Age/life expectancy  
  - Comorbid conditions  
  - Known CVD or advanced microvascular complications  
  - Hypoglycemia unawareness  
  - Individual patient considerations
What is Cardiovascular Disease?

- Cardiovascular disease is the broad term for problems with the heart and blood vessels. These problems are often due to atherosclerosis.
- Atherosclerosis is the buildup of plaque on the walls of blood vessels.

Types of Cardiovascular Disease

- Coronary Artery Disease (CAD)
  - CAD is the most common type of HD
  - Involves the formation of plaque in the walls of arteries of the heart, which results in narrowing of the lumen of the blood vessel.
  - Can ultimately facilitate the development of heart failure or arrhythmias as a result of weakening of the heart muscle.

Types of Cardiovascular Disease

- Heart Failure (HF) – occurs when the heart muscle becomes weak and cannot pump out enough oxygen-rich blood.
  - Can affect either right or left side of heart or both
  - Hypertension and CAD are the most common causes of HF.
Types of Cardiovascular Disease

- Peripheral Artery Disease – occurs as a result of atherosclerosis of arteries of the legs and feet
- Injury of nerves and tissue in those areas can result because of the poor oxygen supply

Types of Cardiovascular Disease

- Stroke – occurs when blood supply to brain is blocked
  - Ischemic stroke – results from a blood clot that blocks the flow of blood to the brain
  - Hemorrhagic stroke – occurs when a blood vessel in the brain becomes weakened and ruptures
    - Usually associated with uncontrolled hypertension or aging blood vessels

Diabetes and Cardiovascular Disease in Women
Diabetes and Cardiovascular Disease
What's the link?

• Studies indicate that only 50% of patients achieve the glycemic goals recommended by the American Diabetes Association (ADA) and approximately two-thirds die prematurely of cardiovascular disease.

Diabetes and Cardiovascular Disease By the Numbers

• Cardiovascular disease accounts for nearly 801,000 deaths in the US.
• 92.1 million American adults are living with some form of cardiovascular disease or the after-effects of stroke.
• Direct and indirect costs of cardiovascular diseases and stroke are estimated to total more than $316 billion.
• Nearly half of all non-Hispanic black adults have some form of cardiovascular disease.

Diabetes and Cardiovascular Disease By the Numbers

• Heart Disease (including Coronary Heart Disease, Hypertension, and Stroke) remains to be the No. 1 cause of death in the US.
• Coronary heart disease accounts for 1 in 7 deaths in the US, accounting for 350,000 deaths per year.
• 700,000 people in the U.S. have heart attacks each year. Of those, about 114,000 will not survive.
• Women with diabetes have a 40% greater risk of developing heart disease and a 25% greater risk of stroke than men with diabetes do.
Assessment

- Which of the following is a risk factor for type 2 diabetes?
  A. HDL Cholesterol
  B. High blood pressure
  C. Obesity
  D. None of the above

Diabetes and Cardiovascular Disease By the Numbers

- At least 68 percent of people age 65 or older with diabetes die from some form of heart disease, and 16% die of stroke.
- Adults with diabetes are two to four times more likely to die from heart disease than adults without diabetes.
- The American Heart Association considers diabetes to be one of the seven major controllable risk factors for cardiovascular disease.

Diabetes and Cardiovascular Disease in Women

- Women with type 2 diabetes have lower higher levels of LDL-cholesterol, HDL-cholesterol.
- Several studies have demonstrated that uncontrolled diabetes (chronic hyperglycemia) is associated with significant risk of the development of microvascular and macrovascular complications.
- There is limited research that has evaluated the gender differences in variations of glucose levels in men and women with diabetes.
- One study involving over 3,000 patients found that women were less likely to have A1c <7%
Risk Factors of CVD in Women

- Diabetes: Women with diabetes are at greater risk of heart disease than men with diabetes.
- Mental stress and depression...
- Smoking...
- Inactivity...
- Menopause...
- Broken heart syndrome...
- Certain chemotherapy drugs and radiation therapy for cancer...
- Pregnancy complications...
- The risk of heart disease in women is often underestimated due to the misconception that females are protected against cardiovascular disease.

Symptoms of Heart Attack in Women

- Uncomfortable pressure, squeezing, fullness or pain in the center of your chest. It lasts more than a few minutes or goes away and comes back.
- Pain or discomfort in one or both arms, the back, neck, jaw or stomach.
- Shortness of breath with or without chest discomfort.
- Other signs such as breaking out in a cold sweat, nausea or lightheadedness.
- As with men, women's most common heart attack symptom is not chest pain or discomfort. But women are somewhat more likely than men to experience some of the other common symptoms, particularly shortness of breath, nausea/vomiting, and back or jaw pain.
- The risk of heart disease in women is often underestimated due to the misconception that females are protected against cardiovascular disease.

Cardiovascular Disease and Risk Management
Blood Pressure Control & T2DM

Action to Control Cardiovascular Risk in Diabetes (ACCORD):

- Does SBP <120 provide better cardiovascular protection than SBP 130-140? No

ADVANCE-BP

- Significant risk reduction

Recommendations: Hypertension/
Blood Pressure Control

Screening and Diagnosis:

- Blood pressure should be measured at every routine visit
- Patients found to have elevated blood pressure should have blood pressure confirmed on a separate day

Recommendations: Hypertension/
Blood Pressure Control

Diastolic Targets:

- Patients with diabetes should be treated to a diastolic blood pressure <90 mmHg
- Lower diastolic targets, such as <80 mmHg, may be appropriate for certain individuals, such as younger patients, if it can be achieved without undue treatment burden
Recommendations: Hypertension/Blood Pressure Control (4)

Treatment:
- Patients with BP >120/80 should be advised on lifestyle changes to reduce BP.
- Patients with confirmed BP >140/90 should, in addition to lifestyle therapy, have prompt initiation and timely subsequent titration of pharmacological therapy to achieve blood pressure goals.


Recommendations: Hypertension/Blood Pressure Control

Treatment:
- In order adults, pharmacological therapy to achieve treatment goals of <130/80 are not recommended.
- Lifestyle intervention including:
  - Weight loss if overweight
  - DASH-style diet including reduced sodium, increased potassium
  - Moderation of alcohol intake
  - Increased physical activity


Recommendations: Hypertension/Blood Pressure Control

Treatment:
- Pharmacological therapy for patients with diabetes and HTN includes:
  - either an ACE inhibitor or angiotensin II receptor blocker
  - if one class is not tolerated, substitute the other
- Multiple drug therapy (two or more agents at maximal doses) generally required to achieve BP targets.

**Recommendations: Hypertension/ Blood Pressure Treatment**

- Treatment for hypertension should include
  - ACE inhibitor
  - Angiotensin II receptor blocker (ARB)
  - Thiazide-like diuretic
  - Oleandomycin calcium channel blockers
  - Multiple drug therapy (two or more agents at maximal doses) generally required to achieve BP targets.

American Diabetes Association Standards of Medical Care in Diabetes. Cardiac disease and risk management. Diabetes Care 2017; 40 (Suppl. 1): S75-S77

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**Recommendations: Hypertension/ Blood Pressure Control**

Treatment:

- If using ACE inhibitors, ARBs, or diuretics, monitor serum creatinine / eGFR & potassium levels.
- In pregnant patients with DM and chronic hypertension, BP targets of 110–130/65–80 are suggested. ACE inhibitors, ARBs, contraindicated during pregnancy.

American Diabetes Association Standards of Medical Care in Diabetes. Cardiac disease and risk management. Diabetes Care 2017; 40 (Suppl. 1): S75-S77

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**Lipid Management**

- In adults not taking statins, a screening lipid profile is reasonable:
  - At diabetes diagnosis
  - At the initial medical evaluation
  - And every 5 years, or more frequently if indicated
  - Obtain a lipid profile at initiation of statin therapy, and periodically thereafter.

American Diabetes Association Standards of Medical Care in Diabetes. Cardiac disease and risk management. Diabetes Care 2017; 40 (Suppl. 1): S60-S71
Recommendations: Lipid Management

- To improve lipid profile in patients with diabetes, recommend lifestyle modification, focusing on:
  - Weight loss (if indicated)
  - Reduction of saturated fat, trans fat, cholesterol intake
  - Increase of e-3 fatty acids, viscous fiber, plant stanols/stanol esters
  - Increased physical activity

Recommendations: Lipid Management

- Intensify lifestyle therapy & optimize glyemic control for patients with:
  - Triglyceride levels >150 mg/dL
    (1.7 mmol/L) and/or
  - HDL cholesterol <40 mg/dL (1.0 mmol/L) in men and <50 mg/dL
    (1.3 mmol/L) in women
  - For patients with fasting triglyceride levels ≥500 mg/dL (6.7 mmol/L),
evaluate for secondary causes and consider medical therapy to reduce the risk of pancreatitis.

Recommendations for Statin Treatment in People with Diabetes

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<tr>
<th>Age</th>
<th>Risk Factors</th>
<th>Statin Intensity</th>
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</thead>
<tbody>
<tr>
<td>&lt;40 years</td>
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<tr>
<td></td>
<td>ASCVD risk factor(s)^*</td>
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<tr>
<td></td>
<td>ASCVD</td>
<td>High</td>
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<tr>
<td>40–75 years</td>
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<td>Moderate</td>
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<td></td>
<td>ASCVD risk factors</td>
<td>High</td>
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<td></td>
<td>ACS &amp; LDL &gt;50 mg/dL who can't tolerate high dose statin</td>
<td>Moderate + ezetimibe</td>
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<tr>
<td>&gt;75 years</td>
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<td>Moderate</td>
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<tr>
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<td>ASCVD risk factors</td>
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<td>ACS &amp; LDL &gt;50 mg/dL who can't tolerate high dose statin</td>
<td>Moderate + ezetimibe</td>
</tr>
</tbody>
</table>

Recommendations: Lipid Management

- In clinical practice, providers may need to adjust intensity of statin therapy based on individual patient response to medication (e.g., side effects, tolerability, LDL cholesterol levels).
- Ezetimibe + moderate-intensity statin therapy provides additional CV benefit over moderate-intensity statin therapy alone: consider for patients with a recent acute coronary syndrome, LDL ≤ 50 mg/dL, or in patients who can't tolerate high-intensity statin therapy.


Recommendations: Lipid Management

- Combination therapy (statin/fibrate) doesn't improve ASCVD outcomes and is generally not recommended. Consider therapy with statin and fenofibrate for men with both triglycerides >200 mg/dL (2.3 mmol/L) and HDL ≤ 34 mg/dL (0.9 mmol/L).
- Combination therapy (statin/niacin) hasn't demonstrated additional CV benefit over statins alone, may raise risk of stroke & is not generally recommended.
- Statin therapy is contraindicated in pregnancy.


High- and Moderate-Intensity Statin Therapy*

<table>
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<tr>
<th>High Intensity Statin Therapy</th>
<th>Moderate-Intensity Statin Therapy</th>
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<tbody>
<tr>
<td>Lowers LDL by ≥50%</td>
<td>Lowers LDL by 30–&lt;50%</td>
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<tr>
<td>Atorvastatin 40-80 mg</td>
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<td>Rosuvastatin 20-40 mg</td>
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<td>Simvastatin 20-40 mg</td>
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<td>Fluvastatin XL 80 mg</td>
<td>Fluvastatin 40 mg</td>
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<tr>
<td>Pitavastatin 2-4 mg</td>
<td>Pitavastatin 10 mg</td>
</tr>
</tbody>
</table>

* Once-daily dosing

American Diabetes Association: Standards of Medical Care in Diabetes—2016. Cardiovascular Disease and Risk Management: Diabetes Care 2016; 39(Suppl 1): S76-81
Recommendations: Antiplatelet Agents

Consider aspirin therapy (75–162 mg/day).

- As a primary prevention strategy in those with type 1 or type 2 diabetes at increased cardiovascular risk.
- Includes most men or women with diabetes age ≥50 years who have at least one additional major risk factor, including:
  - Family history of premature ASCVD
  - Hypertension
  - Smoking
  - Dyslipidemia
  - Albuminuria


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Recommendations: Antiplatelet Agents

- Aspirin is not recommended for ASCVD prevention for adults with DM at low ASCVD risk, since potential adverse effects from bleeding likely offset potential benefits.
- Low risk: such as in men or women with diabetes aged ≥50 years with no major additional ASCVD risk factors.
- In patients with diabetes <50 years of age with multiple other risk factors (e.g., 10-year risk 5–10%), clinical judgment is required.


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Recommendations: Antiplatelet Agents

- Use aspirin therapy (75–162 mg/day) as secondary prevention in those with diabetes and history of ASCVD.
- For patients w/ ASCVD & aspirin allergy, clopidogrel (75 mg/day) should be used.
- Dual antiplatelet therapy is reasonable for up to a year after an acute coronary syndrome.

Recommendations: Coronary Heart Disease

Screening

• In asymptomatic patients, routine screening for CAD isn’t recommended & doesn’t improve outcomes provided ASCVD risk factors are treated.
• Consider investigations for CAD with:
  • Dyspnea
  • Unexplained dyspnea, chest discomfort
  • Signs or symptoms of associated vascular disease incl. carotid bruits, transient ischemic attack, stroke, claudication or PAD
  • EKG abnormalities (e.g., Q waves)

American Diabetes Association. Standards of Medical Care in Diabetes.

Recommendations: Coronary Heart Disease

Treatment

• In patients with known ASCVD, use aspirin and statin therapy (if not contraindicated) and consider ACE inhibitor therapy to reduce risk of cardiovascular events.
• In patients with a prior MI, β-blockers should be continued for at least 2 years after the event.

American Diabetes Association. Standards of Medical Care in Diabetes.

Recommendations: Coronary Heart Disease

Treatment

• In patients with symptomatic heart failure, TZDs should not be used.
• In type 2 diabetes, patients with stable CHF, metformin may be used if renal function is normal but should be avoided in unstable or hospitalized patients with CHF.

American Diabetes Association. Standards of Medical Care in Diabetes.
Lifestyle Interventions

- Observational studies suggest that patients who report healthier diets and greater physical activity have fewer cardiovascular events.
- Specific caloric distribution should be individualized based on patient's need.
- Weight loss and physical activity will lead to decreased triglycerides and increased HDL cholesterol.
- Patients should be encouraged to reduce the amount of saturated fat intake.
- Patients should be encouraged to decrease time of sedentary behavior.
- The ADA recommends that adults with type 1 or type 2 diabetes engage in at least 150 min of moderately paced physical activity per week.

Key Points

- Diabetes is the 7th leading cause of death in the U.S.
- Uncontrolled diabetes is associated with the development of microvascular and macrovascular complications.
- Cardiovascular disease is the major cause of morbidity in patients with diabetes.
- Risk of cardiovascular disease in women is often under estimated.
- Effective control of glucose, blood pressure and cholesterol can reduce the risk of development of major cardiovascular events.