Cardiovascular Risk Factors (Hypertension & Dyslipidemia)

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Objectives

• Explain hypertension and lipid goals for diabetes patients and determine how to manage hypertension and dyslipidemia to decrease risk of cardiovascular disease
Atherosclerotic cardiovascular disease (ASCVD)

- Coronary heart disease, cerebrovascular disease, peripheral arterial disease
- Leading cause of morbidity and mortality for patients with diabetes
- Hypertension and hyperlipidemia
  - Commonly coincide with diabetes
  - Independent risk factors for ASCVD
- Preventing or slowing development of ASCVD in people with diabetes
  - Weight loss
  - BP control
  - Management of dyslipidemia
  - Smoking cessation
  - Consideration of anti-platelet therapy
  - Addition of glucose-lowering medications with evidence of cardiovascular benefits
PREDIABETES
84.1 MILLION
9 out of 10 don’t know they have prediabetes
If you have prediabetes, going on a diet for
HEALTHY
MORE ACTIVE
out your risk of getting type 2 diabetes in
HA LF
DIABETES
30.3 million people have diabetes
1 out of 4 don’t know they have diabetes
COST
$245 BILLION
50% higher risk for adults with diabetes
$5
$10
2X
Medical costs for people with diabetes are more than twice as high as for someone without diabetes.

IF YOU HAVE DIABETES, YOU ARE NEARLY 2X MORE LIKELY TO DIE FROM HEART DISEASE OR STROKE
Smoking doubles the risk of heart disease in people with diabetes.
ABCs of Diabetes
A for the AIC test. The AIC test shows what your blood sugar has been over the past three months. High blood sugar can harm your heart and blood vessels, kidney, feet, and eyes.
B for blood pressure. High blood pressure makes your heart work too hard. It can cause heart attack, stroke, and kidney disease.
C for cholesterol. One kind of cholesterol called LDL can build up and damage your blood vessels. It can cause heart attack or stroke.
S for stop smoking. Ask for help or call 1-800-QUIT-NOW.

Ask your health care team:
• What are my AIC blood pressure, and cholesterol numbers and what are my ABC numbers should be, and what can I do to reach your goal?

Tips to reduce your risk for heart disease.

To learn more, visit www.niddk.nih.gov or call 1-800-855-7790.

NDEP National Diabetes Education Program

https://www.niddk.nih.gov/health-information/professionals/diabetes-outreach/diabetes-your-heart-infographic
Hypertension
Case 1

- Bob is a 45 yo male with type 2 diabetes who establishes care in your clinic.
  - BMI 30 kg/m², BP 135/78, repeat BP 136/80
  - HbA1c 6.5% on metformin
  - Spot urine albumin:creatinine normal, serum Cr 0.8
  - LDL 95 on atorvastatin 20 mg daily
  - Non-smoker
  - No history of CVD
  - 10-year ASCVD Risk = 4.5%

• Assuming his repeat BP at home and at his next office visit remain ~136/80, in addition to lifestyle modifications, what is the recommendation for management of his blood pressure?
  
A. No need for anti-hypertensive medication at this time
B. Start anti-hypertensive medication, goal BP < 130/80
C. Neither A or B
D. Either A or B
Hypertension

ADA Standards of Care 2019

• Blood pressure should be measured at every routine clinical visit. Patients found to have elevated blood pressure (≥140/90 mmHg) should have blood pressure confirmed using multiple readings, including measurements on a separate day, to diagnose hypertension.

• Patients with confirmed office-based blood pressure ≥140/90 mmHg should, in addition to lifestyle therapy, have prompt initiation and timely titration of pharmacologic therapy to achieve blood pressure goals.

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Blood pressure goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes, HTN, 10-year ASCVD risk &gt;15%</td>
<td>&lt; 140/90 mmHg</td>
</tr>
<tr>
<td></td>
<td>&lt; 130/80 mmHg (may be appropriate if safely attained)</td>
</tr>
<tr>
<td>Diabetes, HTN, 10-year ASCVD risk &lt;15%</td>
<td>&lt; 140/90 mmHg</td>
</tr>
</tbody>
</table>
Hypertension

ACC/AHA 2017 vs JNC

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>&lt; 120</td>
<td>&lt; 80</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>120-129</td>
<td>&lt; 80</td>
<td>Pre-hypertension</td>
<td>Elevated BP</td>
</tr>
<tr>
<td>130-139</td>
<td>80-89</td>
<td>Pre-hypertension</td>
<td>Stage 1 HTN</td>
</tr>
<tr>
<td>140-159</td>
<td>90-99</td>
<td>Stage 1 HTN</td>
<td>Stage 2 HTN</td>
</tr>
<tr>
<td>≥ 160</td>
<td>≥ 100</td>
<td>Stage 2 HTN</td>
<td>Stage 2 HTN</td>
</tr>
</tbody>
</table>

ACC/AHA 2017 – Goal BP with diabetes mellitus

<table>
<thead>
<tr>
<th>BP Threshold (mmHg)</th>
<th>BP Goal (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td>≥ 130/80</td>
</tr>
</tbody>
</table>

Recommendations for the treatment of confirmed hypertension in people with diabetes.

American Diabetes Association Dia Care 2019;42:S103-S123
Dyslipidemia

Dyslipidemia - Assessment
ADA Standards of Care 2019

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Recommendation</th>
</tr>
</thead>
</table>
| No lipid-lowering therapy, age <40 | Lipid panel:  
  • Diagnosis  
  • Every 5 years if under age 40  
  • More frequently if indicated |
| Lipid-lowering therapy          | Lipid panel:  
  • At initiation of lipid-lowering therapy  
  • 4-12 weeks after initiation or change in dose  
  • Annually thereafter |

https://care.diabetesjournals.org/content/42/Supplement_1/S103
Case 2

• Pam is a 57 yo with 10 year history of type 2 diabetes, hypertension who establishes care in your clinic
  • BMI 32 kg/m², BP 128/76
  • HbA1c 6.8%
  • Medications: Metformin, sitagliptin, lisinopril
  • Non-smoker
  • Spot urine albumin:creatinine normal, serum Cr 0.8
  • Lipid panel
    • Total cholesterol 220 (H)
    • HDL 45 (L)
    • LDL 125 (H)
    • Triglycerides 250 (H)
    • ASCVD 10-year risk = 8.3%

Case 2

• Pam is a 57 yo with 10 year history of type 2 diabetes, hypertension who establishes care in your clinic
  • BMI 32 kg/m², BP 128/76
  • HbA1c 6.8%
  • Medications: Metformin, sitagliptin, lisinopril
  • Non-smoker
  • Spot urine albumin:creatinine normal, serum Cr 0.8
  • Lipid panel
    • Total cholesterol 220 (H)
    • HDL 45 (L)
    • LDL 125 (H)
    • Triglycerides 250 (H)
    • ASCVD 10-year risk = 8.3%

• In addition to lifestyle modifications, what is the best next step in Pam’s lipid management?
  A. No need for lipid-lowering medication at this time
  B. Target LDL by adding a statin
  C. Target triglycerides by adding a fibrate
  D. Target HDL, LDL and triglycerides by adding niacin
Dyslipidemia - Management

ADA Standards of Care 2019

<table>
<thead>
<tr>
<th>Age</th>
<th>ASCVD or ASCVD 10-year risk &gt;20%</th>
<th>Recommended statin intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 40 years</td>
<td>No</td>
<td>None or Moderate</td>
</tr>
<tr>
<td>≥ 40 years</td>
<td>Yes</td>
<td>High</td>
</tr>
</tbody>
</table>

*Patients with ASCVD and LDL ≥ 70 despite max tolerated statin, consider additional LDL-lowering therapy (e.g., ezetimibe or PCSK-9 inhibitor)*

https://care.diabetesjournals.org/content/42/Supplement_1/S103

Dyslipidemia - Management

2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APHa/ASPC/NLA/PCNA Guideline

- LDL-C ≥190 mg/dL (4.9 mmol/L)
- None or moderate-intensity statin (Class I)
- Diabetes mellitus and age 60-75 y
  - Moderate-intensity statin
  - Risk assessment to consider high-intensity statin (Class Ia)
- Age > 75 y
  - Clinical assessment, Risk discussion
Dyslipidemia - Management

AACE Guidelines 2017

### Risk Category

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Risk factors/10-year risk</th>
<th>LDL-C (mg/dL)</th>
<th>Non-HDL-C (mg/dL)</th>
<th>Apo-B (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme</td>
<td>• Progressive ASCVD in individuals achieving LDL &lt; 70</td>
<td>&lt; 55</td>
<td>&lt; 80</td>
<td>&lt; 70</td>
</tr>
<tr>
<td></td>
<td>• Established clinical CVD with DM, stage 3/4 CKD, or HeFH</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• History premature ASCVD (&lt;55 male, &lt;65 female)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very high</td>
<td>• Established or recent hospitalization for ACS, coronary/carotid/PVD, 10-year risk &gt;20%</td>
<td>&lt; 70</td>
<td>&lt; 100</td>
<td>&lt; 80</td>
</tr>
<tr>
<td></td>
<td>• DM or CKD 3/4 + 1 risk factor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• HeFH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>• ≥ 2 risk factors and 10 yr risk 10-20%</td>
<td>&lt; 100</td>
<td>&lt; 130</td>
<td>&lt; 90</td>
</tr>
<tr>
<td></td>
<td>• DM or CKD 3/4 &amp; no other risk factor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>• ≤ 2 risk factors and 10-year risk &lt;10%</td>
<td>&lt; 100</td>
<td>&lt; 130</td>
<td>&lt; 90</td>
</tr>
<tr>
<td>Low risk</td>
<td>• 0 risk factors</td>
<td>&lt; 130</td>
<td>&lt; 160</td>
<td>NR</td>
</tr>
</tbody>
</table>

Statin intensity

<table>
<thead>
<tr>
<th>High-intensity statin therapy (Lowers LDL cholesterol by ≥ 50%)</th>
<th>Low-intensity statin therapy (Lowers LDL cholesterol by 30-50%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atorvastatin 40-80 mg</td>
<td>Atorvastatin 10-20 mg</td>
</tr>
<tr>
<td>Rosuvastatin 20-40 mg</td>
<td>Rosuvastatin 5-10 mg</td>
</tr>
<tr>
<td>Simvastatin 20-40 mg</td>
<td>Simvastatin 20-40 mg</td>
</tr>
<tr>
<td>Pravastatin 40-80 mg</td>
<td>Pravastatin 40-80 mg</td>
</tr>
<tr>
<td>Lovastatin 40 mg</td>
<td>Lovastatin 40 mg</td>
</tr>
<tr>
<td>Fluvastatin XL 80 mg</td>
<td>Fluvastatin XL 80 mg</td>
</tr>
<tr>
<td>Pitavastatin 2-4 mg</td>
<td>Pitavastatin 2-4 mg</td>
</tr>
</tbody>
</table>
Case 2b

- Pam is a 57 yo with 10 year history of type 2 diabetes, hypertension who returns for follow up
  - BMI 32 kg/m², BP 128/76
  - HbA1c 6.8%
  - Medications: Metformin, sitagliptin, lisinopril, atorvastatin 40 mg daily
  - Non-smoker
  - Spot urine albumin:creatinine normal, serum Cr 0.8

- Lipid panel
  - Total cholesterol 165 (down from 220)
  - HDL 45 (L)
  - LDL 74 (down from 125)
  - Triglycerides 230 (H) (down from 250)

- Regarding Pam’s lipid management, what could be considered to further reduce her risk of CVD?
  - A. Add niacin to further reduce CVD risk
  - B. Add fenofibrate to further reduce CVD risk
  - C. Add icosapent ethyl to further reduce CVD risk
  - D. Change atorvastatin 40 mg daily to simvastatin 40 mg daily
REDUCE-IT Trial

- **Icosapent ethyl** (pure EPA) vs. placebo
- **8179 statin-treated** adults
  - Modestly elevated triglycerides (135-499 mg/dL)
  - Median LDL 75 mg/dL
  - Either CVD or DM + 1 other risk factor
  - Median follow up 4.9 years
- **Icosapent ethyl**
  - **25% reduction in composite endpoint** (CVD death, nonfatal MI, nonfatal stroke, coronary revascularization, or unstable angina)
  - **20% reduction in cardiovascular death**

- ADA Standards of Care update, March 2019
  - “In patients with ASCVD or other cardiac risk factors on a statin with controlled LDL-C, but elevated triglycerides (135-499), the addition of icosapent ethyl should be considered to reduce cardiovascular risk.”

Other lipid lowering therapies

- **Fibrates**
  - No significant benefit when added to statins for reduction of ASCVD
  - Consider for significantly elevated triglycerides (>500 mg/dl) to reduce risk of pancreatitis

- **Niacin**
  - No benefit when added to statins for reduction of ASCVD
  - Increased risk of side effects
  - Not recommended

- **Omega-3 fatty acids**
  - Consider for significantly elevated triglycerides (>500 mg/dl) to reduce risk of pancreatitis
  - **Icosapent ethyl – reduced ASCVD risk**
Conclusions

- Management of blood pressure and lipids is crucial to reduce ASCVD risk in patients with diabetes
- Guidelines differ on BP goals, < 130/80 vs < 140/90
- ACE or ARB remain 1st line for HTN + albuminuria
- LDL lowering remains cornerstone of lipid management in patients at risk of ASCVD, with or without diabetes
- PCSK-9 inhibitors and ezetimibe can be considered to lower LDL further in high-risk individuals
- Icosapent ethyl should be considered for patients on statin, who have elevated triglycerides, to further reduce risk of ASCVD

Questions?