Diabetes Complications

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Courtesy Univ Texas San Antonio
Risks for Complications in Diabetes

• Abnormal blood sugar
• Abnormal cholesterol
• Abnormal blood pressure
Avoiding Diabetes Complications

• Blood glucose control A1C <7%

• Treat cholesterol profiles to targets
  – Total cholesterol <200
  – Triglycerides <150
  – HDL (“good”) >40 men, >50 women
  – LDL (“bad”) <100, <70 high risk

• Treat blood pressure to target <130/<80
Diabetes Complications

- Cardiovascular disease
  - Coronary Heart disease (CHD)
  - Stroke
  - Peripheral arterial disease (PAD)/amputation
- Eye disease (retinopathy)
- Kidney disease (nephropathy)
- Nerve disease (neuropathy)
- Diabetes deaths annually in the U.S. ~233,000
A1C and Relative Risk of Microvascular Complications: DCCT

Adapted with permission from Skyler J. *Endocrinol Metab Clin North Am.* 1996;25:243
UKPDS: 1% A1C Decrease and Reduced Risk of Complications

- Lower-extremity amputation or fatal peripheral vascular disease†
- Microvascular disease†
- Cataract extraction†
- Heart failure*
- Myocardial infarction†
- Cardiovascular complications
- Stroke*

*P<.05; †P<.0001.
UKPDS=United Kingdom Prospective Diabetes Study.
Cardiovascular Disease

• Risk:
  – Stroke 2 to 4 times higher
  – Heart Disease 2 to 4 times higher

• ~75% of diabetes patients have high blood pressure (hypertension)

• ~75% of people with diabetes have a dyslipidemia (cholesterol disease)

• Heart disease and stroke ~65% of diabetes deaths
Cholesterol Targets in Diabetes

- Total Cholesterol <200
- Triglycerides <150
- HDL (good)
  - >40 for males
  - >50 for females
- LDL (bad)
  - <100
  - <70 for high risk
Commonly Used Anti-Cholesterol Medications

• Statins
  – Potent
  – Lower total cholesterol, LDL most effectively
  – Cut CVD risk by ~30%

• Fibrates
  – Target triglycerides
  – Often used in combo with Statins

• Niacin

• Omega-3 fish oils
Hypertension in Diabetes

• Target blood pressure <130/<80
• Reduces risk
  – Heart disease
  – Stroke
  – Kidney disease
Common Anti-Hypertensives

- ACEI: Lisinopril (Prinivil), Ramipril (Altace), others
- ARB: Valsartan (Diovan), Losartan (Cozaar), others
- Beta-Blockers: atenolol, metoprolol (Toprol), carvedilol (Coreg-mixed function), others
Common Anti-Hypertensives

• Calcium Channel Blockers- Amlodipine (Norvasc), Verapamil (Covera, Verelan), others

• Diuretics- Hydrochlorothiazide, others
Hypertension Medications

• ACEI and ARB medications are initial drugs of choice for HTN in DM

• Benefit of lowering blood pressure, reducing heart attack, stroke, and kidney disease
Diabetes and Cardiovascular Disease

• Aspirin Therapy is indicated for Diabetes Patients over the age of 35

• 81-325 mg daily depending on risk factors and co-morbidities

• CV risk reduction 15-50%

• Smoking cessation

• Meal planning
Death rates for cardiovascular disease in diabetes are declining in North Dakota
- Men: CHD 8.7/1000 >> 6.5/1000
  Stroke 1.2/1000 >> 0.75/1000
- Women: CHD 6.1/1000 >> 4.4/1000
  Stroke 1.4/1000 >> 0.5/1000

Better recognition and treatment?
Diabetic Nephropathy

• Diabetic kidney disease

• Leading cause of kidney disease in U.S.
  – 44% of all new cases of kidney disease

• >46,000 patients start treatment for end stage kidney disease annually

• Most patient with end-stage disease will start on dialysis
Nephropathy: Avoidance

• A1C <7.0

• BP’s <130/<80, weight reduction, avoidance of NSAIDS if possible

• Microalbumin screening

• Usually treated with ACEI or ARB, other BP meds if needed, dietary sodium and protein restriction
Diabetic Retinopathy

• Diabetic eye disease
• About 40% of persons with Diabetes have Retinopathy
• 12,000 to 24,000 new cases of blindness annually in U.S.
Retinopathy: Avoidance

- A1C <7.0, less glucose variability?
- Annual dilated eye exams by eye care professional
- Laser photocoagulation for overt retinopathy
- New medications on the horizon:
  - Ruboxistaurin (Arxxant)(PKC* inhibitor)-just received FDA approval

*Protein Kinase C
Diabetic Neuropathy

- Diabetic nerve damage
- ~60-70% of patients with diabetes
  - Feet
  - Can also occur in hands, carpal tunnel syndrome, in the intestines, cardiac
- Neuropathy contributes to amputations
Neuropathy: Avoidance

A1C <7%
Neuropathy: Treatment

• Anti-seizure meds (gapapentin, pregabatin)
• Tricyclic anti-depressants (amitriptyline)
• Duloxetine-antidepressant with neuropathy indication
• Capsazin creme
Peripheral Arterial Disease

• Blockage of arteries in legs

• Contributing factor to amputations in diabetes:
  – ~60% of lower limb amputations occur in people with diabetes
  – ~71,000 lower limb amputations annually in people with diabetes
  – Amputation rate is 10 times higher in diabetes
Peripheral Artery Disease: Avoidance

- A1C <7%

- Treat same risk factors as heart attack and stroke
  - Treat to target blood pressure
  - Treat to target cholesterol
  - Daily aspirin
Peripheral Arterial Disease: Treatment

- “Bypass” surgery (usually femoral artery to popliteal artery)
- Medications
  - Aspirin daily
  - Clopidogrel
- Amputation for severe disease
  - Tissue death
  - Severe infection (“gangrene”)
Summary: Reducing Diabetes Complications

• A1C < 7%
• Treat blood pressure to target of <130/<80
• Treat cholesterol profiles to target
• Low dose aspirin for appropriate patients
• Lifestyle changes
  – Meal Plan
  – Appropriate exercise plan
  – Smoking Cessation
• Proper and timely follow-up with providers