

# Diabetes Complications Guideline Based Screening, Management, and Referral

Eric L. Johnson, M.D.

Associate Professor

Department of Family and Community Medicine

Assistant Medical Director

Altru Diabetes Center

# Objectives

- Review Diabetes Complications (and co-existing conditions)
- Discuss, understand, and implement screening for Diabetes Complications
- Learn guideline based treatment strategies for treatment and referral for Diabetes Complications

# Diabetes Complications

## Macrovascular Complications

- Cardiovascular disease
  - Coronary Heart disease (CHD)
  - Stroke
  - Peripheral arterial disease (PAD)/amputation

# Diabetes Complications

## Microvascular Complications

- Eye disease (retinopathy)
- Kidney disease (nephropathy)
- Nerve disease (neuropathy)

# Diabetes Complications

## Other complications

- Liver disease (NAFLD, NASH)
- All cause mortality risk

# Blood Pressure and Lipids

## Cardiovascular Disease

# 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)

# Cardiovascular Disease

- Heart disease and stroke ~65% of diabetes deaths
- **Routine screening of asymptomatic not recommended**
- Treat risk factors (lipids, BP, smoking, etc)

Diabetes Care January 2012; 35 (Supplement 1)



# Blood Pressure

- Done at every visit (x2?)
- Target is  $<140/<90$
- Consider lower targets, but  $<130/<70$  may not be beneficial in this population

American Diabetes Association. *Diabetes Care*. 2016;39(suppl 1)

# 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), Diltiazem (Cardizem), others
- Diuretics- Hydrochlorothiazide, others

# Hypertension Treatment

- ACEI, ARB, thiazide diuretic, dihydropyridine calcium channel blockers (i.e., nifedipine, amlodipine) are all choices for initial therapy (all shown to reduce CVD in DM)
- ACEI and ARB medications are initial drugs of choice for HTN in DM if albuminuria or proteinuria
- NOTE: this is a guideline change
- Be sure to check potassium levels, serum creatinine, and eGFR

# Hypertension Treatment

- Lowering blood pressure reduces CVD and kidney disease
- Caveat: worsening renal function on ACEI or ARB warrants imaging of kidneys/renal arteries or nephrology referral
- If on more than one anti-hypertensive, consider giving one at bedtime

# Lipids (Cholesterol)

- Increased cardiovascular risk (e.g., LDL cholesterol  $\geq 100\text{mg/dL}$  [2.6 mmol/L], high blood pressure, smoking, albuminuria, and family history of premature ASCVD) and with ASCVD
- Obtain a lipid profile at initiation of statin therapy and periodically thereafter because doing so may help monitor the response to therapy and inform about adherence

American Diabetes Association  
Standards of Care 2016

# Anti-Lipid Therapy

Age	Risk factors	Recommended statin intensity*
<40 years	None	None
	ASCVD risk factor(s) <sup>†</sup>	Moderate or high
	ASCVD	High
40–75 years	None	Moderate
	ASCVD risk factors	High
	ASCVD	High
	ACS and LDL >50 mg/dL who cannot tolerate high-dose statin	Moderate plus ezetimibe
>75 years	None	Moderate
	ASCVD risk factors	Moderate or high
	ASCVD	High
	ACS and LDL >50 mg/dL who cannot tolerate high dose statin	Moderate plus ezetimibe

\*In addition to lifestyle therapy.

<sup>†</sup>ASCVD risk factors include LDL cholesterol  $\geq$  100 mg/dL (2.6 mmol/L), high blood pressure, smoking, overweight or obesity, and family history of premature ASCVD.

ACS, acute coronary syndrome.

# Statin Intensity

<b>High–intensity statin therapy</b>	<b>Moderate–intensity statin therapy</b>
Lowers LDL by $\geq 50$ : Atorvastatin 40–80 mg Rosuvastatin 20–40 mg	Lowers LDL by 30% to $<50$ %: Atorvastatin 10–20 mg Rosuvastatin 5–10 mg Simvastatin 20–40 mg Pravastatin 40–80 mg Lovastatin 40 mg Fluvastatin XL 80 mg Pitavastatin 2–4 mg

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# Commonly Used Anti-Lipid Medications

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

## Ezetimibe

- Add to statin if high dose not tolerated

# What About Statin Intolerance?

- Be sure that's what it is
- Consider pravastatin
- Fish oil+niacin+ezetimibe

# Anti-Lipid Medications

## Caveats:

- Use with caution in known liver disease (but may improve fatty liver-NAFLD)
- Use with caution in more advanced kidney disease (usually dose reduction)
- Increasing muscle aches- rare complication of rhabdomyolysis

# Summary: Blood Pressure and Lipids Treatment

BP:

ACEI or ARB if albuminuria or proteinuria

Lipids:

- Statins first line +/- ezetimibe
- Fibrates, Fish Oil, Niacin, Colsevelam not a lot of data

Treating these appropriately aggressively reduces CVD and renal disease

# Aspirin

- If no contraindications
- Men >50 years of age
- Women >50 years of age
- Younger if higher risk

American Diabetes Association. *Diabetes Care*. 2013;37(suppl 1)

# Smoking

- Refer to appropriate resources
- Consider FDA approved medications
- E-cigs are NOT recommended at this time

American Diabetes Association  
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# Heart Disease and Stroke Symptoms

- Educate patients about heart disease and stroke symptoms
- I have seen patients with fairly advanced disease without a lot of symptomatology
- Large knowledge gaps exist with patients

# Kidney Disease



# Diabetic Kidney Disease

- Characterized by proteinuria
- Prevalence 15-40% in type 1
- Prevalence 5-20% in type 2
- More common in African Americans, Asians, and Native Americans
- Associated with risk of CVD

NKF

# Diabetic Kidney Disease Screening

- Annual urine testing for albuminuria or proteinuria  
(microalbuminuria will no longer be used)
- Annual creatinine and GFR
- Start at diagnosis for type 2
- Start 5 years after diagnosis type 1

*Diabetes Care.* 2014;37(suppl 1)

# Kidney Disease Management

- ACEI or ARB for albuminuria or proteinuria
- Serum creatinine and creatinine clearance (or GFR) monitoring
- May need 24 hour urine protein
- May need nephrology referral
- Blood pressure to target <140/<90
- A1C <7 for appropriate patients

*Diabetes Care. 2013;36(suppl 1)*

# ACEI/ARB in Diabetes

- Not prescribed only for the diagnosis of diabetes
- Used for hypertension or albuminuria/proteinuria in the absence of hypertension

# Retinopathy

# Retinopathy Screening

- Type 1 annual starting after age 10 or after 5 years post diagnosis
- Type 2 annual starting shortly after diagnosis
- Consider less frequent if one or more normal exams (not usually done)

*Diabetes Care.* 2014;37(suppl 1)

# Retinopathy Management

- A1C < 7 for appropriate patients
- Laser photocoagulation by ophthalmologist or retinologist

# Neuropathy



# Diabetic Peripheral Neuropathy

- DPN affects ~60-70% of patients with diabetes
  - Feet typical initial presentation, burning, tingling, numbness
- Neuropathy contributes to amputations

# Neuropathy Screening

- Screen at diagnosis and annual thereafter
- Be aware of less common presentations

Foot inspection every visit plus annual/prn:

- Filament testing
- Vibratory testing (128 HZ)
- Reflexes

American Diabetes Association. *Diabetes Care*. 2014;37(suppl 1)

# Neuropathy: Treatment

- Optimize blood glucose control
- Consider other differentials, i.e. B12 deficiency in metformin users, thyroid
- Anti-seizure meds (gabapentin, pregabalin)
- Tricyclic anti-depressants (amitriptyline)
- Duloxetine-antidepressant with neuropathy indication
- Capsazin creme

# Other Screening

# Celiac Disease Screening

- At diagnosis in Type 1 and periodic (?), pregnant
- Rescreen if GI symptoms, failure to thrive, glycemic control changes
- ~10% of type 1?

Test:

- Tissue transglutaminase IgA and IgG

Or

- Anti-endomysial antibodies with serum IgA
- Confirmed with small bowel biopsy

American Diabetes Association. *Diabetes Care*. 2014;37(suppl 1)

# Thyroid Screening

- Type 1 screen at diagnosis and every 1 to 2 years, and if pregnant
- At diagnosis, thyroid peroxidase and thyroglobulin antibodies
- TSH thereafter

# Liver Disease

# Fatty Liver

- NAFLD (non-alcoholic fatty liver disease)
- NASH (non-alcoholic steatohepatitis)
- At least 30% of type 2 patients
- Underdiagnosed
- Current treatment is weight loss, possible future medication role
- Type 2 also higher risk of hepatitis C

Tolman KG et al Diabetes Care 2007;30: 734-74  
Johnson EL Journal of Family Practice 2012



# Fatty Liver

- Usually marked by minor liver function test abnormalities (alkaline phosphatase, ALT, AST)
- No specific treatment, but metformin, TZD, glp-1, insulin may improve
- If persistent LFT abnormalities:
  - imaging (ultrasound, CT, MRI)
  - screen for hepatitis
  - consider gastroenterology referral

# Psychological

- Be aware of depression or anxiety
- Diabetes Distress

# Cases

# Case #1

- 32 year old with type 1 diabetes
- BP 144/86, 148/90 2 separate occasions
- No albuminuria/proteinuria
- “I’ve never had high blood pressure before”
- What next?

# Case #1

- Hard for persons with type 1 to “get their heads around” having high blood pressure

Clear indication for HTN treatment

## Case #2

- 56 year old female 10 years duration type 2 diabetes
- HTN on ARB
- 20 pack year history smoking, quit 3 years ago
- Chol 202 TG 260 HDL 34 LDL 104
- Now what?

# Case #2

- Should be on aspirin 81 mg daily
  - High risk (2 additional CVD risk factors)
  - Would be tempting to use low dose statin to start
  - 40-75, risk factors, high dose statin
    - Atorvastatin 40–80 mg
    - Rosuvastatin 20–40 mg
- Take time to explain why

## Case #3

- 60 year old Hispanic male
- Metformin, DPP-IV inhibitor
- Started on ACEI for HTN
- Serum creatinine at start 1.1
- 4 weeks later 2.9
- Now what?



# Case #3

- Renal ultrasound shows bilateral renal artery stenosis

# Summary

- Diabetes complications can be avoided or minimized with good glucose control
- Appropriate, guideline based screening is important for early detection
- Cardiovascular disease is extremely common in diabetes, treat risk factors appropriately
- Know when to make appropriate referrals