



VA/DoD Evidence-Based Practice

USING THE VA/DOD DIABETES CPG IN YOUR PRACTICE

A CASE STUDY APPROACH

2011

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SCREENING & PREVENTION

Primary Prevention:

- Consider screening all adults at age ≥ 45 for diabetes or an earlier age if risk factors present
- Consider aerobic exercise and diet to achieve weight loss and prevent the progression of prediabetes to diabetes

RISK FACTORS FOR DIABETES

- **Pre-diabetes**
 - (impaired glucose tolerance (IGT) and/or impaired fasting glucose (IFG))
- **Family history of diabetes**
 - (First-degree relative with DM)
- **Overweight or obese***
 - (BMI ≥ 25 kg/m²)*, or have abdominal obesity*
- **Sedentary Lifestyle**
- **Member of high risk population**
 - (e.g., Hispanic American, African-American, Asian Americans and Pacific Islanders, and Native American)
- **Low HDL cholesterol (<40) or high triglycerides (>250)**
- **Hypertension**
 - (blood pressure $\geq 140/90$ mmHg)*
- **Other clinical conditions associated with insulin resistance**
 - (e.g., acanthosis nigricans, non-alcoholic steatohepatitis (NASH))
- **History of polycystic ovarian syndrome (PCOS)***

*associated with insulin resistance

DIAGNOSIS OF DIABETES

STATUS	Fasting Plasma Glucose (FPG) ^{(a), (b)} or, Hemoglobin A _{1c} ^(c)	Casual Plasma Glucose
Diabetes Mellitus	A _{1c} ≥7% on <u>two</u> occasions or A _{1c} is ≥6.5% <u>and</u> FPG ≥126 mg/dl (7.0mmol/L) or FPG ≥126mg/dL (7.0mmol/L) on <u>two</u> occasions	Casual plasma glucose ≥200 mg/dL (11.1mmol/L) plus symptoms of diabetes (<i>polyuria, polydipsia, and unexplained weight loss</i>)
Pre-diabetes	FPG ≥100 and <126mg/dL on <u>two</u> occasions or A _{1c} ≥5.7 but <6.5% and FPG ≥100 but <126mg/dL	—
Normal	FPG <100 mg/dL A _{1c} <5.7%	—

(a) Fasting is defined as no caloric intake for at least 8 hours.

(b) FPG is the preferred test for diagnosis, but either of the two listed is acceptable. In the absence of unequivocal hyperglycemia with acute metabolic decompensation, one of these two tests should be done on different days

(c) Using a clinical laboratory (not point of care)

(d) Casual means any time of day w/out regard to time since the last meal

John: A Case Study



- 45 year old male
- Married with two children
- Long distance truck driver
- His grandfather has 'old age' diabetes
- Screening at work:
 - Fingerstick- 133 mg/dl
 - Blood Pressure- 150/90
 - Waist Circumference- 42 inches
 - Height- 72 inches
 - Weight- 221 BMI- 30 kg/m²

Initial Office Evaluation

- Fasting plasma glucose: 122 mg/dl
- Fasting plasma glucose: 118 mg/dl
- A1C is 5.8%
- Blood pressure: 160/95
- Lipids
 - LDL- 125 mg/dl
 - Cholesterol- 214mg/dl
 - Triglycerides- 256 mg/dl
 - HDL-30
 - CHOL/HDL ratio: 7.1

What does John have?
Does John have dyslipidemia?
What is the next step?



John has HTN, Dyslipidemia, Pre-diabetes and Obesity

Address HTN/Cholesterol/ Encourage weight management and lifestyle modification-set goals

Refer for Dietary Counseling

When to follow up? (3-6 mos)

One Year Later

(age 46, did not follow up as recommended)

- Still a truck driver
- Has not changed food behaviors
- Has not lost weight
- Cannot find time to exercise
- Is changing companies and needs a pre-employment physical

Prior Medical History

- Pre-diabetes
- HTN
- Dyslipidemia
- Obesity

Current Medications

- Lisinopril® 5mg daily



At Medical Visit:

Complains of nocturia, constant fatigue, and erectile dysfunction

- Fasting Plasma Glucose: 225 mg/dl
- A1C: 8.5%
- Weight: 244 lbs BMI: 33.1 kg/m²
- Waist Circumference: 44 inches
- Blood Pressure: 166/100
- Lipids
 - LDL: 145 mg/dl
 - HDL: 35 mg/dl
 - CHOL: 230 mg/dl
 - Triglycerides: 250 mg/dl
 - CHOI / HDL ratio: 6.6
- UA:
 - >1000 mg/dl glucose, otherwise normal



John has progressed to Type 2 Diabetes

Which medications to start on? Monotherapy or Dual Therapy?

Algorithm G for Basic Glycemic Control of Outpatient Adults with Type 2 Diabetes

Begin Mono or Dual Therapy:

Generally start with *Metformin (review contraindications) or consider sulfonylurea (Glyburide[®], Glipizide[®])

Titration of Metformin reduces risk of initial side effects:

Titrate q7 days if no GI upset, more slowly w/GI upset.

Consider Metformin XR (extended release), if regular Metformin not tolerated

Consider: ASA prophylaxis (if other cardiovascular disease risk factors present), ACE-I or ARB, and a Statin

* Targets not met after one month

Algorithm 2 for Basic Glycemic Control of Outpatient Adults with Type 2 Diabetes

Target not met after 3 months:

- Begin Dual Therapy.
- Metformin + Sulfonylurea, TZD or Sitagliptin

Targets Met:
Check A_{1c} every 6 months

Targets NOT met after 3 months:

- Add 3rd oral agent or Exenatide if A_{1c} < 8.5%
- OR**
- Add long acting insulin for any A_{1c} > target
 - Consider referral to endocrinology

CPG Therapeutic Goals

**A_{1c}: glycemic target is patient /provider specific
based on co-morbid conditions**

BP: <140/80

LDL: <130 - based on co-morbid conditions

Most Common Oral Medications

Biguanides: metformin (Glucophage[®]) – keeps liver from releasing too much glucose- also used for Polycystic Ovarian Syndrome (PCOS), fatty liver disease, pre-diabetes

Sulfonylurea: glyburide, glipizide, glimipiride (Glucotrol XL[®]) - stimulates the pancreas to make more insulin

TZD: pioglitazone, (Actos[®])- works on the muscle to make muscle more sensitive to insulin

DPP-4 Inhibitors: sitagliptin (Januvia) -stimulates beta cells to increase insulin production, suppresses release of glucagon

***Meglitinides**: repaglinide, nateglinide, (Starlix[®])- short acting stimulation of the pancreas to make more insulin

Non-Insulin Injectable Medication

GLP-1 Agonist: Exenatide (Byetta[®]): attaches to cells

- Stimulate body's ability to produce insulin when blood glucose increases
- Reduces blood sugar fluctuations
- Suppresses the release of glucagon
- Appetite suppressant
- Slows rate that nutrients are moved into the blood stream
- **Do Not** use in combination with insulin
- # 1 side effect is nausea

Types of Insulin

(Refer to Basic Core Formulary for Most Current Listings)

	Onset	Peak	Duration	Comment
<u>Rapid Acting</u>				
Novolog	10-20 min	1-3 hours	3-5 hrs	Both types are used in insulin pumps, <u>inject 10 min prior to meals</u>
Humalog	15-30 min	30 min to 2 ½ hours	3-5 hrs	Covers insulin needs for meals eaten within 10-30mins, or as advised by physician
<u>Short Acting</u>				
Regular (R)	30 min-1 hr	2-5 hours	5-8 hrs	Increased risk of nocturnal hypoglycemia compared to Novolog
<u>Intermediate Acting</u>				
NPH (N)	1-2 hrs	4-12 hours	18-24 hrs	Usually given twice daily; Increased risk of nocturnal hypoglycemia compared to Novolog
<u>Long Acting</u> Lantus- pen or vial Levemir-pen or vial	1-1 ½ hrs	None	20-24 hrs	Lantus-usually given once a day Levemir-Once or twice a day
<u>Pre-mixed</u> Novolog Mix70/30	10-20 min	1-4 hrs	Up to 24 hrs	May be given up to three times per day.

John-Has Not Met Goals



Now 47 years old; still a truck driver

Office visit: (Annual follow up)

- Fasting Plasma Glucose: 240 mg/dl
- A1c: 9.0%
- Wt: 267 lbs. BMI=36.2 kg/m²
- BP: 140/85
- LDL: 108 mg/dl
- HDL: 35 mg/dl
- Microalbumin:creatinine=36mg/dl

Action is Needed:

Is it time for insulin? Long acting?
Is Diabetes Management needed?
Does patient need referral to
specialty care for nephropathy,
neuropathy, or retinopathy?
Need another BP med?



Current Meds:

- Metformin 1000mg BID
- Pioglitazone15mg QD
- ASA 81mg QD
- Lisinopril[®] 20mg QD
- HCTZ[®] 12.5mg QD
- Zocor[®] 20mg Q HS

6 Months later....

- FPG: 92mg/dl
- A1C: 6.7%
- Weight: 244 lbs
- BMI: 33 kg/m²
- Waist Circumference: 44 inches

- Blood Pressure: 128/66
- Lipids
 - LDL: 78 mg/dl
 - HDL: 37 mg/dl
 - CHOL: 152 mg/dl
 - Triglycerides: 139 mg/dl

Glycemic Control:

Glargine 10 units SQ
- titrate 2 units every 3 days
until target FBG reached

Metformin 2000mg daily
Pioglitazone 30mg daily

Blood Pressure Mgt:

Lisinopril® 40mg daily
HCTZ 12.5mg daily

Cholesterol Mgt

Simvastatin 40mg

red = new
since last visit

Education:

Behavior change / Skills training

Tobacco Cessation
Nutrition Education
Increasing Activity

Recommended screenings:

Foot / Eye/ Kidney/
A₁c (biannually)/ Lipids

Recommended Schedule for Exams / Tests

Foot exam: neuropathy & lower extremity problems

Eye exam: retinopathy

A1C every 6 months: >7%- every 3 mos

Lipid profile- every 3 months to 1 year

Urine microalbumin screening: nephropathy

Health Preventive Measures

- Consider aspirin therapy to reduce the risk of fatal cardiovascular events (may not be necessary, are there other risk factors present?)
- Advise about tobacco use cessation
- Provide influenza vaccination (in season)
- Provide pneumonia vaccine, if indicated
- PATIENT SELF-MANAGEMENT AND EDUCATION:
 - Empower patients to make informed decisions about their self-care of diabetes

Summary

*Primary Prevention

- Consider screening all adults (age >45) for diabetes, at earlier age for risk factors
- Consider aerobic exercise and diet to achieve weight loss and prevent the progression of prediabetes to diabetes.

*Secondary Prevention

- Achieve individualized HbA_{1c} target through diet, exercise, medication, and patient education.
- Reduce and control blood pressure to improve quality and length of life, and prevent micro- and macrovascular complications.
- Control cholesterol to reduce risk for cardiovascular disease

*Tertiary Prevention

- Screen annually for kidney disease.
- Screen for retinopathy- using a dilated eye examination.
- Screen annually for lower extremity complications and risk stratification



POST TEST

Which of the following is not a risk factor for pre-diabetes?

- a. Women with PCOS (Polycystic Ovarian Syndrome)
- b. BMI \geq than 25
- c. Latino, Native American, Asian American, Pacific Islanders, African-Americans
- d. Having an uncle with diabetes

Which is not a recommended annual screening for microvascular complications?

- a. One A1c yearly
- b. One lipid profile yearly
- c. Urine micro-albumin screening for nephropathy yearly
- d. Foot exam for neuropathy and lower extremity problems yearly

POST TEST

According to the VA/DoD guideline, which of these people does not need a screening for pre-diabetes or diabetes?

- a. Active 40 year old Caucasian male with BMI of 24 and pre-hypertension
- b. A female with history of gestational diabetes
- c. 46 year old Caucasian male
- d. Latino with BMI >35 with HTN and Hyperlipidemia

Which of the following are recommended for diagnosis of diabetes according to the VA/DoD guidelines?

- a. Casual glucose ≥ 200 on one occasion
- b. Casual glucose is ≥ 200 with symptoms of hyperglycemia
- c. One time A1c of $\geq 7\%$
- d. A1c $\geq 6.5\%$ and FPG (fasting plasma glucose) is ≥ 126