



Guideline for Disease Management in Correctional Settings

DIABETES

Recommended Resources to Support Evidence-Based Practice and Quality Improvement

NCCHC issues guidelines to assist correctional health care clinicians in evidence-based decision making. For specific clinical practice guidelines and recommendations, please see the resources listed on page 3.

Introduction

Although clinical guidelines are important decision support for evidence-based practice, to leverage the potential of guidelines to improve patient outcomes and resource use, NCCHC recommends that health care delivery systems also have components including primary care teams, other decision support at the point of care (such as reminders), disease registries, and patient self-management support. These components have been shown to improve outcomes for patients with chronic conditions. In addition, we recommend establishment of a strategic quality management program that supports ongoing evaluation and improvement activities focused on a set of measures that emphasize outcomes as well as process and best practice. For information on the chronic care model, model for improvement, and outcomes measures, see the resources listed on page 3.

Diabetes Care in Corrections

The general approach to the management of diabetes mellitus (DM) is organized into four components:

- Assessment and monitoring of disease severity and control to reduce microvascular risk (retinopathy, neuropathy, nephropathy) and macrovascular (cardiovascular) risk
- Patient education and self-management about the disease process, lifestyle modifications, self-monitoring blood glucose, and medication use
- Mitigation of factors that increase blood glucose such as lack of timely access to medications, certain medications, infections and other stressors, and comorbidities that increase risk such as hypertension, hyperlipidemia and kidney disease, and factors that increase the risk of hypoglycemia
- Medications including first-line oral agents such as metformin, and insulin

At a minimum, routine screening for DM should occur for inmates with a body mass index greater than 25 and a history of hypertension and/or hyperlipidemia, and those over 45 years of age. The American Diabetes Association recommends using the fasting plasma glucose (FPG) test to diagnose DM based on an FPG greater than 125 mg/dL after at least an 8-hour fast rather the hemoglobin-A1c (HbA1c) test or the oral glucose tolerance test (OGTT). However, HbA1c may be elevated (above 6.5% is usually diagnostic) in older patients with normal FPG who have postprandial hyperglycemia. All pregnant women should be screened using the OGTT.

There are two types of DM, type 1 and type 2. Although type 2 DM may require insulin at some stage, type 1 always requires it because there is an absolute deficiency in insulin, which can lead to ketoacidosis. In adults, type 2 is most common and often is associated with obesity. The pathophysiology of type 2 DM includes a relative deficiency of insulin and resistance to insulin that constitutes a problem with glucose metabolism and fat metabolism.

Once DM is diagnosed, it is important to obtain baseline blood pressures and diagnostic studies including HbA1c, fasting lipid profile, blood electrolytes and creatinine, thyroid function, electrocardiogram if the patient's age is over 35 years, and urine microalbumin unless there is gross proteinuria on urinalysis or

the patient is already on an ACE inhibitor. In addition, baseline dilated eye exam and foot should be performed.

The treatment goals to prevent or mitigate morbidity and mortality related to DM are to achieve HbA1c below 7.0% *and* LDL cholesterol below 100 mg/dL (below 70 mg/dL if the patient has cardiac or kidney disease), *and* systolic blood pressure (SBP) below 130 mmHg and diastolic blood pressure (DBP) below 80 mmHg without causing significant hypoglycemia or hypotension. (See Table 1.)

Table 1. Parameters of Control			
Control	HbA1c (%)	LDL Cholesterol (mg/dL)	Blood Pressure (mmHg)
Good	< 7	< 100*	< 130/< 80
Fair	7-9	100-130	130-140/80-90
Poor	> 9	> 130	> 140/> 90
* For high-risk patients, good control is < 7.0.			

Table 2. Correcting A1c With Serum Blood Glucose	
HbA1c (%)	Mean Blood Glucose (mg/dL)
6	135
7	170
8	205
9	240
10	275
11	310
12	345

To achieve an HbA1c below 7.0%, ongoing monitoring of FPG is usually required until the average level is below 130 mg/dL. This is because the initial goal is to “fix the fasting first.” If the HbA1c remains high yet the FPG on average is below 130 mg/dL, then monitoring of 2-hour postprandial plasma glucose (PPPG) levels is important, with a goal of less than 180 mg/dL.

As with all chronic conditions, self-management is paramount to improve outcomes and reduce morbidity and mortality. Some correctional systems now provide dietary choices that have less salt, less fat, and fewer calories. It also is important that patients are educated about healthier foods available in the commissary, maintenance of normal weight, exercise, and adherence to medications.

Type 1 DM patients should perform blood glucose finger sticks at least three times a day, and subsets of patients should be allowed to keep glucometers in their cells so that they can check FPG levels and PPPG levels. It is extremely important that patients who are receiving rapid-acting insulin and short-acting insulin are given food within 15 minutes and 30 minutes, respectively, to avoid hypoglycemia. In addition, glucagon should be readily available to all DM patients.

Although medication adherence is facilitated by simple regimens, patients with type 1 DM, and a small number of patients with type 2 DM receiving insulin, may require dosing three times a day.

There are essentially two types of oral diabetic medications: secretagogues such as sulfonylureas, and insulin sensitizers such as metformin and thiazolidinediones. Because most patients with type 2 DM are

overweight, the first line oral diabetic agent is usually metformin. Metformin is not associated with hypoglycemia or weight gain.

There are two types of insulins, basal and prandial. Basal insulins are given to control blood glucose between meals and target FPG levels. Basal insulins include long-acting agents such as insulin glargine and intermediate-acting agents such as neutral protamine Hagedorn (NPH). Long-acting agents are used when FPG remains elevated but the patient has episodes of hypoglycemia when taking intermediate-acting agents. Prandial insulins include rapid-acting insulin analogues and short-acting insulin analogues, which are used to control postprandial glucose levels.

Many patients with diabetes will also require a statin to maintain LDL cholesterol levels below 100 mg/dL and one or more medications to maintain SBP below 130 mmHg and DBP below 80 mmHg. Most diabetes patients should also receive a daily dose of aspirin 81 mg.

Quality Improvement Measures

The following quality improvement measures are suggested, but they are not intended to be a complete list necessary to ensure a successful diabetes management program in a correctional setting. We recommend that the improvement measures for a patient population be reported at a facility level and at a provider or team level. These indicators should be compared over time to correlate improvement.

- Percentage of diabetes patients who undergo a complete intake health assessment screening within 7 days (prison) or 14 days (jail) of intake
- Percentage of diabetes patients with a dilated eye examination in the preceding 12 months
- Percentage of diabetes patients with a fasting lipid panel in the preceding 12 months
- Percentage of diabetes patients with urine microalbumin checked in the preceding 12 months if not already prescribed an ACE inhibitor or an angiotensin II receptor blocker
- Percentage of diabetes patients with a documented foot examination in the preceding 12 months
- Percentage of diabetes patients with HbA1c above 9% and below 7%
- Percentage of diabetes patients with SBP below 130 mmHg and DBP below 80 mmHg
- Percentage of diabetes patients with LDL cholesterol below 100 mg/dL
- Percentage of diabetes patients HbA1c below 7% and LDL cholesterol below 100 mg/dL and SBP below 130 mmHg and DBP below 80 mmHg
- Percentage of diabetes patients whose degree of control is fair or poor (as defined in Table 1) whose plan includes a documented strategy for improving diabetes and cardiovascular control

Recommended Resources to Support Evidence-Based Practice and Quality Improvement

RESOURCE Diabetes Care: Clinical Practice Recommendations (January 2011)

SOURCE American Diabetes Association

URL http://care.diabetesjournals.org/content/34/Supplement_1

RESOURCE Diabetes Management in Correctional Institutions (January 2011)

SOURCE American Diabetes Association

URL http://care.diabetesjournals.org/content/34/Supplement_1/S75.full.pdf+html

RESOURCE Standards of Medical Care in Diabetes. I. Classification and Diagnosis (January 2011)

SOURCE American Diabetes Association, available from the National Guideline Clearinghouse, Agency for Healthcare Research and Quality

URL <http://www.guideline.gov/content.aspx?id=25327>

RESOURCE Glycemic Control and Type 2 Diabetes Mellitus: The Optimal Hemoglobin A1c Targets. A Guidance Statement from the American College of Physicians (September 2007)
SOURCE *Annals of Internal Medicine*
URL <http://www.annals.org/content/147/6/417>

RESOURCE Diabetes Portal: Clinician Resources
SOURCE American College of Physicians
URL <http://diabetes.acponline.org/clinician/>

RESOURCE Tools: Diabetes
SOURCE Institute for Healthcare Improvement
URL <http://www.ihl.org/IHI/Topics/ChronicConditions/Diabetes/Tools>

RESOURCE Chronic Care Model (1998)
SOURCE Developed by Ed Wagner MD, MPH, MacColl Institute for Healthcare Innovation, Group Health Cooperative of Puget Sound, and the Improving Chronic Illness Care program; available from the Institute for Healthcare Improvement
URL <http://www.ihl.org/IHI/Topics/ChronicConditions/AllConditions/Changes>

RESOURCE Model for Improvement (1997)
SOURCE Associates in Process Improvement; available from the Institute for Healthcare Improvement
URL <http://www.ihl.org/IHI/Topics/Improvement/ImprovementMethods/HowToImprove>

RESOURCE Measures
SOURCE Institute for Healthcare Improvement
URL <http://www.ihl.org/IHI/Topics/Improvement/ImprovementMethods/Measures>

RESOURCE HEDIS & Quality Measurement
SOURCE National Committee for Quality Assurance
URL <http://www.ncqa.org/tabid/59/Default.aspx>

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