Chapter 12.
endocrine System Disorders

12.1. Diabetes Mellitus

Description

Diabetes is a metabolic disorder characterized by persistently high blood glucose levels. Diabetes may be caused by a variety of environmental and genetic factors resulting in deficient secretion of insulin from the pancreas, resistance to insulin, or a combination of the two.

Diabetes may lead to the following acute (emergency) conditions with confusion, coma, and shock:

- Hyperglycemia (excess of sugar in the blood) with or without ketoacidosis (see section 12.2 "Hyperglycemia and Ketoacidosis")
- Hypoglycemia (abnormal decrease of sugar in the blood) (see section 16.8 "Hypoglycemia")

Diabetes may lead to the following chronic complications after many years:

- Heart, kidney, or vascular disease
- Decreased immune function
- Chronic wounds
- Blindness

Three common forms of diabetes are encountered.

- Type I diabetes
  - May occur at any age but is seen most commonly in children and young adults with a peak incidence before school age
  - Tends to present with the most severe initial symptoms (see "Diagnosis" below)
  - Is a catabolic disorder with circulating insulin virtually absent and plasma glucagon elevated
  - Often requires insulin treatment to reverse this catabolic state
- Type II diabetes
  - Typically presents in adults and adolescents (may rarely be seen in children)
  - Is often related to obesity, which may play a significant role in the severity of the disease
  - Tends to present with more gradual initial symptoms; often patients present with the chronic complications of diabetes before the disease is recognized
  - Is usually treated with diet changes, oral medication, or both
- Gestational diabetes—elevated blood glucose that is detected during pregnancy
  - Is often detected on antenatal exam (with check of glucose)
  - Requires careful management by a team of medical doctors and obstetricians, so patient must be referred
  - May persist after delivery or present again later in life

Medications to treat diabetes mellitus are limited to EPHS facilities.

- *All* patients require referral.
- BPHS facilities may need to—
  - Treat diabetic emergencies (see section 12.2 "Hyperglycemia and Ketoacidosis" and section 16.8 "Hypoglycemia")
  - Assist or support the patient with chronic and

ongoing care initiated at EPHS facility

Diagnosis

- Type I diabetes tends to present with the most dramatic and severe findings, although the common

signs and symptoms may be present in all forms of diabetes:

- Polyuria—passing of frequent, large amounts of urine
- Thirst and excessive drinking of water
- Nocturnal enuresis
- Weakness and fatigue
- Unexplained weight loss or, in children, failure to gain weight or grow
- Blurred vision
- Recurrent infections such as skin abscesses, urinary tract infections, vulvovaginitis or pruritus, and other fungal infections
- Evidence of chronic complications
  - Peripheral neuropathy
  - Evidence of vascular disease
  - Ischemic heart disease
  - Strokes
  - Foot ulcers
- History of obstetric complications (gestational diabetes)
  - Infertility
  - Recurrent stillbirths
  - Large babies
- Laboratory
- Blood glucose (when available by test strip or glucometer)
  - Fasting blood sugar (most reliable): If more than 126 mg/dl on more than one occasion, diabetes is confirmed
  - Random blood sugar: more than 200 mg/dl
- Urine dipstick: glucose more than ++
- Emergency presentations associated with diabetes
- Hyperglycemia
  - Patient who have undiagnosed or poorly controlled diabetes may present with dehydration, confusion, coma, or shock (see below)
  - Patients who have long-term diabetes may be prone to heart disease, stroke, infection, or blindness
- Hypoglycemia
  - Patients who have hypoglycemia from too much insulin or oral medication may present with a change in mood, confusion, or coma (see section 16.8 “Hypoglycemia”).

Management

Goals for BPHS staff are to— ▪ Identify the disease and refer ▪ Treat diabetic emergencies and refer ▪ Provide chronic care support

Nonpharmacologic

- Ensure the patient is correctly taking the medications from the referral facility.
- Assist with weight loss (for obese patients) and proper diet. Advise the patient to—
  - Avoid processed sugar
  - Eat regular (i.e., 3 times a day), balanced meals
  - Avoid alcohol use
  - Get regular physical exercise

- Avoid smoking
- Prevent long-term complications.
- Monitor for infections.
- Control blood pressure.
- Monitor for visual and eye problems.
- Assist skin care and hygiene; treat wounds aggressively.
- Avoid foot trauma.

Pharmacologic
- Type I diabetes—insulin as initiated by EPHS facility
- Type II diabetes—diet control with or without oral agents, as initiated by EPHS facility
- Diabetic emergencies: confusion, coma, and dehydration
- Suspected hyperglycemia plus ketoacidosis, give fluid resuscitation, and refer. (See section 16.9 "Shock" for a discussion of fluid resuscitation.)
- Suspected hypoglycemia, give oral or IV glucose, and refer. (See section 16.8 "Hypoglycemia" and section 16.9 "Shock.")
- If patient presents in coma and glucose status is not known, treat for hypoglycemia (i.e., give glucose), and refer (see section 16.8 "Hypoglycemia").

Referral
- *All* patients suspected of having diabetes should be referred to EPHS facility for appropriate laboratory testing and appropriate treatment.
- Patients who have gestational diabetes may benefit from special antenatal services (e.g., ultrasound) when available.
- Treat medical emergencies prior to referral, and transport with medical staff, if possible (see below and see section 16.8 "Hypoglycemia").

Prevention
- Type II diabetes may be prevented or treated in some patients using—
  - Weight control (i.e., weight loss in obese patients)
  - Proper diet
  - Regular physical exercise
- Complications of diabetes can be reduced or prevented with—
  - Good blood sugar control
  - Prevention of infections
    - Good hygiene
    - Good skin, and especially foot, care
    - Proper-fitting shoes to avoid local trauma **Patient Instructions**
- Review and observe patient taking medicine prescribed by the referral facility as instructed.
- Review and observe patient performing self-monitoring activities ordered by the referral facility as instructed, such as use of glucometer and recognition of symptoms of hypoglycemia and how to manage the symptoms.
- Review and support dietary and exercise recommendations.
- Ask the patient to carry his or her patient card with diagnosis, dose of insulin (if any), and name and telephone number of family doctor.
- Inform the patient that sometimes diabetes is seen in families. Monitor for symptoms in family members.

12.2. Hyperglycemia and Ketoacidosis

Description

Diabetes ketoacidosis is a life-threatening medical emergency. Diabetes ketoacidosis may be the initial manifestation of type I diabetes and may result from an increased insulin requirement in type I diabetes patients during the course of infection, trauma, myocardial infarction, or surgery. Patients with type II diabetes may develop ketoacidosis under severe stress such as infection or trauma.

Diagnosis

The diagnosis of ketoacidosis relies on mild symptoms before the emergency signs and symptoms appear.

- Mild symptoms