

1.9 DIABETES MELLITUS

Diabetes mellitus is a disease characterized by abnormal insulin production or disordered glucose metabolism and is a comorbid condition of many hospitalized patients. Diabetic ketoacidosis (DKA) and hyperglycemia hyperosmolar state (HHS) are extreme presentations of diabetes mellitus that require hospitalization. Diabetes mellitus is present in nearly 10% of the US population, and it is more common in older adults, affecting at least 25% of persons older than 65 years.¹ Type 2 diabetes mellitus accounts for 90% to 95% of all diagnosed cases of diabetes in adults.¹ Annually, more than 700,000 hospital discharges occur with diabetes mellitus or DKA as the primary diagnosis.² Hospitalists care for diabetic patients and optimize glycemic control in the hospital setting. They stabilize and treat DKA and HHS. The inpatient setting provides an opportunity to institute therapies to slow disease progression, prevent disease complications, and provide diabetes education to improve quality of life and limit complications leading to readmission. Hospitalists use evidence-based approaches to optimize care and lead multidisciplinary teams to develop institutional guidelines or care pathways to optimize glycemic control.

KNOWLEDGE

Hospitalists should be able to:

- Define diabetes mellitus and explain the pathophysiologic processes that lead to hyperglycemia, DKA, and HHS.
- Describe the impact of hyperglycemia on immune function and wound healing.
- Describe the effect of DKA and HHS on intravascular volume status, electrolytes, and acid–base balance.
- Describe the clinical presentation and laboratory findings of DKA and HHS.
- Describe the indicated tests to evaluate and diagnose DKA and HHS.
- Explain the physiologic stressors and medications that adversely affect glycemic control.
- Explain the precipitating factors of DKA and HHS.
- Identify the goals of glycemic control in hospitalized patients in various settings, including critically ill and surgical patients.
- Recognize the indications for managing DKA and HHS in an intensive care unit.
- Recognize indications for early specialty consultation, which may include endocrinology and nutrition.
- Summarize the indications, contraindications, and mechanisms of action of pharmacologic agents used to treat diabetes mellitus.
- Recognize features that indicate disease severity.
- Recognize the impact of suboptimal glycemic control on other concurrent medical conditions and illness.
- Explain goals for hospital discharge, including specific measures of clinical stability for safe care transition.

SKILLS

Hospitalists should be able to:

- Elicit a thorough and relevant medical history and review the medical record to identify factors that can affect glycemic control.
- Estimate the level of previous glycemic control, adherence to medication regimen, and social influences that may affect the quality of glycemic control in hospitalized patients.
- Perform a comprehensive physical examination to identify possible precipitants of hyperglycemia, DKA, or HHS.
- Select and interpret indicated studies in patients suspected of having DKA or HHS, including relevant metabolic and acid–base measurements.
- Develop an individualized management plan for patients with controlled and uncontrolled diabetes mellitus, DKA, HHS, and any associated complications.
- Adjust medications and dosages to achieve optimal glycemic control and minimize adverse effects.
- Evaluate and treat the signs and symptoms of hypoglycemia (especially neuroglycopenia).
- Direct the perioperative management of the diabetic patient, and when necessary, manage or comanage the patient with the primary requesting service.
- Assess caloric and nutritional needs and recommend a suitable diet.
- Assess hospitalized patients for undiagnosed diabetes mellitus.
- Recognize and address the effects of various diabetic complications such as neuropathic pain.
- Communicate with patients and families to explain the natural history and prognosis of diabetes mellitus.
- Communicate with patients and families to explain potential long-term complications of diabetes mellitus and preventive strategies, including foot and eye care.
- Communicate with patients and families to explain the importance of glycemic control and factors that affect it such as adhering to medication regimens and self-monitoring, following dietary and exercise recommendations, and attending routine follow-up appointments.
- Communicate with patients and families to explain the potential adverse effects or adverse interactions of diabetes medications, including hypoglycemia.
- Facilitate discharge planning early in the admission process.
- Recommend appropriate postdischarge care, which may include endocrinology, ophthalmology, and podiatry.
- Communicate with patients and families to explain the goals of care, discharge instructions, and management after hospital discharge to ensure safe follow-up and transitions of care.
- Document the treatment plan and provide clear discharge instructions for postdischarge clinicians, including the need for continued nutrition and diabetic counseling.

ATTITUDES

Hospitalists should be able to:

- Employ a multidisciplinary approach, which may include nursing, nutrition, social services, and diabetes education, to the care of patients with diabetes that begins at admission and continues through all care transitions.
- Follow evidence-based recommendations in the treatment of inpatients with diabetes mellitus.

SYSTEM ORGANIZATION AND IMPROVEMENT

To improve efficiency and quality within their organizations, hospitalists should:

- Lead, coordinate, and/or participate in multidisciplinary teams, which may include nursing, nutrition, and endocrinology, to promote quality and cost-effective diabetes management.
- Lead, coordinate, and/or participate in efforts to develop guidelines and protocols that standardize the assessment and man-

agement of uncontrolled diabetes mellitus, DKA, and HHS.

- Lead, coordinate, and/or participate in initiatives to standardize hospital formulary-based diabetes therapies to reduce the likelihood of an adverse drug event.
- Lead, coordinate, and/or participate in efforts to develop guidelines and/or protocols to optimize glycemic control in hospitalized patients including suitable regimens in critically ill medical and surgical patients.
- Implement systems to ensure hospital-wide adherence to national standards and document those measures as specified by recognized organizations.

References

1. Centers for Disease Control and Prevention. *National Diabetes Statistics Report: Estimates of Diabetes and Its Burden in the United States, 2014*. Atlanta, GA: US Department of Health and Human Services; 2014.
2. Agency for Healthcare Research and Quality. Healthcare Cost and Utilization Project. U.S. Department of Health & Human Services. Available at: <http://hcupnet.ahrq.gov/>. Accessed July 2015.