

HOSPITAL PHYSICIAN®

INTERNAL MEDICINE BOARD REVIEW MANUAL

STATEMENT OF EDITORIAL PURPOSE

The *Hospital Physician Internal Medicine Board Review Manual* is a peer-reviewed study guide for residents and practicing physicians preparing for board examinations in internal medicine. Each manual reviews a topic essential to the current practice of internal medicine.

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Inpatient Management of Diabetes Mellitus

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Inpatient Management of Diabetes Mellitus

Michael J. Gardner, MD

INTRODUCTION

As the population ages and obesity becomes a worldwide epidemic, diabetes mellitus is becoming an increasingly prevalent disease. Over a recent 8-year period, 1 large population study documented an increase of about 33% in the prevalence of diabetes in the United States.¹ Based on 2005–2006 NHANES data, the prevalence of diabetes was 12.9% in the United States, with approximately 40% of diabetes going undiagnosed.² Worldwide there will be a 114% increase in the number of individuals with diabetes, with developing countries bearing the brunt of this increase.³ With this increased prevalence, the number of patients with diabetes in the hospital is also on the rise. In fact, patients with diabetes are overrepresented in the hospital population due both to admissions for direct metabolic derangements and admissions related to the comorbidities of diabetes such as cardiovascular disease, renal insufficiency, and peripheral vascular disease.


The impact of inpatient hyperglycemia has both economic and patient welfare consequences. In economic terms, patients with diabetes incur approximately 5 times the per capita cost of health care for those without diabetes, with the majority of the excess cost due to hospitalizations. Of the approximately \$76 billion in annual inpatient costs accrued by patients with diabetes in 2002 (18% of US total), over half was directly attributable to diabetes.⁴ Patients with hyperglycemia have an increased risk of requiring admission to the intensive care unit (ICU) and are less likely to return home after hospitalization. Those without known diabetes prior to admission but with inpatient hyperglycemia also had longer inpatient stays and poorer outcomes than euglycemic patients.⁵

Although the benefits of improved outpatient glyce-mic control have been acknowledged for some time, only recently has the management of diabetes in the hospital setting received the same degree of attention.⁶ Hyperglycemia was an accepted side effect of hospitaliza-tion, especially when, as is often the case, the patient was admitted for a diagnosis other than diabetes. Glycemic therapy has focused on the simple yet suboptimal sliding scale insulin approach, which treats high glucose levels

after they occur and does nothing to prevent hyperglyce-mia, leading to widely fluctuating glucose levels.

CASE STUDY

INITIAL PRESENTATION

 A 52-year-old man was admitted to the trauma service last night following a motorcycle acci-dent during which he suffered orthopedic, abdominal, and head injuries. Overnight he has undergone surgery and he is currently in the surgical ICU on mechanical ventilation. The patient had elevated blood glucose levels on admission, which have remained elevated postoperatively. The patient's wife is at bedside and is intimately familiar with her husband's medical history.

HISTORY

The patient was diagnosed with type 2 diabetes 3 years ago and was placed on lifestyle modification and metformin (2000 mg/day). Glimperide (2 mg/day) was added 1 year ago due to increasing home blood glucose readings. His most recent glycosylated hemo-globin (HbA_{1c}) 1 month ago was 7.2%. He has not experienced any recent hypoglycemic episodes. Home blood glucose records for the last 2 weeks show blood glucose tested twice daily and an average reading of 180 mg/dL. He has no known diabetic complications and is up to date on his screening studies. Blood pres-sure and lipids were managed to goal based on the most recent American Diabetes Association (ADA) guidelines prior to admission with the use of lisinopril (10 mg/day) and simvastatin (40 mg/day).

PHYSICAL EXAMINATION

Vital signs show a blood pressure of 140/72 mm Hg and a heart rate of 80 bpm. Height is 177.8 cm and weight is 95 kg with a body mass index (BMI) of 30 kg/m². He is sedated and on mechanical ventilation. His laparotomy incision is well approximated, clean, and dry as are the attachment points of the external fixator attached to the right forearm and the incision from the repair of his left