Acute Care of Patients With Diabetes

Preface

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Diabetes mellitus has reached epidemic proportions not only in the United States but also worldwide.[1] Diabetes is the leading cause of end-stage renal disease, adult blindness, and nontraumatic lower limb amputation[2] and ranks seventh as a cause of death in this country. The incidence of cardiovascular events, as well as renal disease and glaucoma, is increased manyfold in patients with diabetes.[3,4]

Landmark studies such as the Diabetes Control and Complications Trial[5] and the United Kingdom Prospective Diabetes Studies[6] demonstrated that control of blood glucose in both type 1 and type 2 diabetes results in significant risk reduction of microvascular diseases. But despite that conclusive evidence, the incidence of acute complications of diabetes has not been significantly reduced and in fact is on the rise.[7] This can be attributed in part to the inaccessibility of health care to certain segments of the population, inadequate dissemination of practice guidelines to health care providers, and/or patients' difficulty in following recommended guidelines.

The national hemoglobin A_{1c} average for patients with diabetes remains alarmingly high.[8] Only 13% of such patients achieved the goal of <7% in a long-term follow-up study.[6] Subsequently, uncontrolled diabetes leads to a greater number of acute and chronic complications and hospital visits.

In addition to acute metabolic decompensation of diabetes, such as insulin-induced hypoglycemia, diabetic ketoacidosis (DKA), and hyperglycemic hyperosmolar syndrome (HHS), patients with uncontrolled diabetes have a greater susceptibility to other acute sequelae. Such conditions as systemic and nonsystemic infections, stroke, and myocardial infarction (MI) occur with greater frequency and therefore require increased hospitalizations. In the United States in 1996, chronic and acute complications of diabetes resulted in expenditures in excess of $99 billion, approximately 70% of which was spent for inpatient and outpatient hospitalization.[9]

In this From Research to Practice section, we have been fortunate to be able to gather a group of distinguished physicians and health care providers to provide up-to-date information on a variety of acute complications that are more frequently or specifically seen in patients with diabetes.

Philip E. Cryer, MD, and Belinda P. Childs, ARNP, MN, CDE, have provided us with an up-to-date review on the pathogenesis and treatment of hypoglycemia in diabetes (p. 20). As the use of intensive insulin therapy for type 1 diabetes increases, the incidence of hypoglycemia is expected to rise. Health care providers need to be more aware of the increased incidence, particularly in patients with type 1 diabetes who are deficient in counterregulatory hormones such as catecholamines and glucagon.[10]

DKA and HHS constitute two of the most common acute complications of diabetes, with significant morbidity and mortality. Despite advances in our understanding of the pathogenesis of these conditions, the mortality rate averages 5% for DKA and 15% for HHS even at the best medical centers. Recently, the American Diabetes Association asked our group to develop an in-depth technical review of the subject and a position statement for management of hyperglycemic crises.[11,12] Guillermo E. Umpierrez, MD, FACP; Mary Beth Murphy, RN, MS, CDE, MBA; and I have summarized these two documents in a brief review (p. 28) in

hopes that such an article will provide health care providers with specific guidelines on the management of such disease states.

Dennis S. Schaberg MD, FACP, and John M. Norwood, MD, have provided a case study and comprehensive review on the management of common infections seen in patients with diabetes (p. 37). Poor control of blood glucose places patients at risk for the development of secondary infections. Frequently encountered infections include gram-negative pneumonia and polymicrobial infection of soft tissues, especially in the lower extremities, which can lead to severe fascitis. Rhinocerebral mucormycosis can occur in as many as 50% of patients with DKA.[13] The authors conclude by stating that control of hyperglycemia is an important goal in the prevention of these infections.[14]

Claresa Levetan, MD, and Meeta Sharma, MD, have provided an insightful case study and review of the literature on the effect of hyperglycemia in hospitalized patients with or without a history of diabetes (p. 40). They have emphasized the importance of treating such conditions (regardless of their cause) to significantly reduce mortality, particularly in patients with cardiovascular events.

The Diabetes Insulin-Glucose in Acute Myocardial Infarction (DIGAMI) study of the effect of a glucose, insulin, and potassium infusion solution on patients with MI clearly established the superiority of this therapy over saline control in reducing mortality in these patients.[15] However, this practice has not been universally adopted mainly because of the lack of additional prospective randomized studies to corroborate these findings. Such a multicenter trial is needed to settle this controversial issue and perhaps lead to a decrease in morbidity and mortality in patients with diabetes.

Because an overwhelming portion of total diabetes costs goes to inpatient hospitalization, it is important to establish guidelines for the management of patients before, during, and immediately after surgery. Samuel Dagogo-Jack, MD, FRCP, and K. George M.M. Alberti, DPhil, PRCP, have provided us with practical guidelines for patients using either insulin alone, oral agents alone, or combination therapy (p. 44). They emphasize the importance of close follow-up and proper preparation of these individuals before surgery.[16] Interestingly, there is very little recent information in this area, which needs to be updated through collaborative research among relevant disciplines.

With the rise in pancreas transplant activity resulting from better management of organ donor procurement and a reliable registry, certain centers have achieved seminal distinction for successful pancreas transplantation. The team of transplant surgeons at the University of Tennessee Health Science Center has developed a novel technique of portal venous and enteric drainage, which has worked successfully in many of their patients.[17] M. Hosein Shokouh-Amiri, MD; Robert J. Stratta, MD; Kashif A. Latif, MD; and Osama Gaber, MD, have provided us with guidelines on the selection of patients for pancreas transplantation and clinical guidelines on the pre- and post-operative management of these patients (p. 49).

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