Advances in Anesthesia 32 (2014) 171–190
ADVANCES IN ANESTHESIA

Perioperative Management of the Patient with Diabetes

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Keywords

• Diabetes • Glycemic control • Insulin • Hypoglycemia • Hyperglycemia

Key points

- Diabetes is common in patients undergoing surgical procedures and is an important risk factor for adverse perioperative outcomes.
- Patients with type 1 diabetes must be provided with a continuous source of insulin at all times.
- For most patients with diabetes, glucose lower than 180 mg/dL (10 mmol/L) is a reasonable target.
- Insulin therapy resulting in hypoglycemia is associated with worse outcomes.
- Any efforts to prevent or treat hyperglycemia must include strategies to prevent, monitor for, and treat hypoglycemia.
- A multidisciplinary perioperative glycemic control program can result in safe and effective care.

INTRODUCTION

Background

The term "diabetes" describes several diseases of abnormal carbohydrate metabolism that are characterized by hyperglycemia, along with a relative or an absolute impairment of insulin secretion and varying degrees of peripheral resistance to the metabolic effects of insulin. According to the Centers for Disease Control and Prevention, the prevalence of diabetes in the United States among individuals 20 years or older is now approximately 8.3% and rates among those older than 65 years is greater than 25%. The economic burden

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0737-6146/14/$ – see front matter
http://dx.doi.org/10.1016/j.aan.2014.08.001

of diabetes has been estimated at $245 billion in the United States alone, with $176 billion being direct medical costs, an increase of 41% compared with 2007 estimates [1]. The impact of diabetes on health systems is expected to grow, as rates of obesity and prediabetes, major risk factors for the development of diabetes, increase.

Diabetes is overrepresented in patients undergoing anesthesia compared with the general population. Approximately 14% of noncardiac surgical patients carry the diagnosis of diabetes. In patients undergoing cardiac surgery, some reports suggest more than 30% have diabetes [2]. Additionally, a significant number of patients who require surgery are diabetic, but have not been formally diagnosed [2–5]. Diabetes is an independent risk factor for adverse outcomes after surgery [6–8], and diabetes and prediabetes are risk factors for perioperative hyperglycemia and hypoglycemia [9–11]. Thus, the perioperative management of patients with diabetes is a modifiable risk factor and is of significant importance to patients and health care systems. This importance has contributed to perioperative glycemic management being identified as a quality metric by multiple patient advocacy groups, as well as payers. This review describes current classifications and treatments of diabetes, discusses the anesthetic implications of diabetes and the current literature addressing perioperative glycemic control and outcomes, and provides recommendations for developing a perioperative glycemic management program.

Classification of diabetes

Diabetes is classified into 4 clinical categories with a range of insulin requirements and sensitivities (Fig. 1) [12].

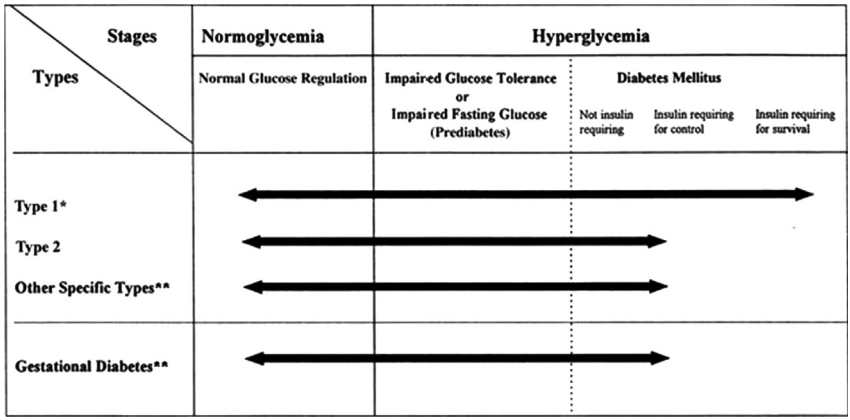

Fig. 1. Disorders of glycemia: etiologic types and stages. *Even after presenting in ketoacidosis, these patients can briefly return to normoglycemia without requiring continuous therapy (ie, ''honeymoon'' remission); **in rare instances, patients in these categories (eg, Vacor toxicity, type 1 diabetes presenting in pregnancy) may require insulin for survival. (*From* American Diabetes Association. Diagnosis and classification of diabetes mellitus. Diabetes Care 2013;36(Suppl 1):S68; with permission.)