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REVIEW ARTICLE

Evaluation and perioperative management of patients with diabetes mellitus. A challenge for the anesthesiologist☆

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Abstract Diabetes mellitus (DM) is characterized by alteration in carbohydrate metabolism, leading to hyperglycemia and increased perioperative morbidity and mortality. It evolves with diverse and progressive physiological changes, and the anesthetic management requires attention regarding this disease interference in multiple organ systems and their respective complications. Patient's history, physical examination, and complementary exams are important in the preoperative management, particularly glycosylated hemoglobin (HbA1c), which has a strong predictive value for complications associated with diabetes. The goal of surgical planning is to reduce the fasting time and maintain the patient's routine. Patients with Type 1 DM must receive insulin (even during the preoperative fast) to meet the basal physiological demands and avoid ketoacidosis. Whereas patients with Type 2 DM treated with multiple injectable and/or oral drugs are susceptible to develop a hyperglycemic hyperosmolar state (HHS). Therefore, the management of hypoglycemic agents and different types of insulin is fundamental, as well as determining the surgical schedule and, consequently, the number of lost meals for dose adjustment and drug suspension. Current evidence suggests the safe target to maintain glycemic control in surgical patients, but does not conclude whether it should be obtained with either moderate or severe glycemic control.

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PALAVRAS-CHAVE
Diabetes melito;
Anestesia;
Cuidados perioperatórios;
Hipoglicemiantes;
Insulina;
Hemoglobina glicosilada

Avaliação e manejo perioperatório de pacientes com diabetes melito. Um desafio para o anestesiologista

Resumo O diabetes melito (DM) é caracterizado por alteração no metabolismo de carboidratos que leva à hiperglicemia e ao aumento da morbimortalidade perioperatória. Cursa com alterações fisiológicas diversas e progressivas e, para o manejo anestésico, deve-se atentar para a interferência dessa doença nos múltiplos sistemas orgânicos e suas respectivas complicações. Anamnese, exame físico e exames complementares são importantes no manejo pré-operatório, com destaque para a hemoglobina glicosilada (HbA1c), que tem forte valor preditivo para complicações associadas ao diabetes. O planejamento cirúrgico tem como objetivos a redução do tempo de jejum e a manutenção da rotina do paciente. Pacientes portadores de DM Tipo 1 precisam receber, mesmo em jejum perioperatório, insulina para suprir as demandas fisiológicas basais e evitar cetoacidose. Já os pacientes portadores de DM Tipo 2, tratados com múltiplos fármacos injetáveis e/ou orais, são suscetíveis ao desenvolvimento de um estado hiperosmolar hiperglicêmico (EHH). Assim, o manejo dos hipoglicemiantes e dos diferentes tipos de insulina é fundamental, além da determinação do horário cirúrgico e, consequentemente, do número de refeições perdidas para adequação de doses ou suspensão dos medicamentos. As evidências atuais sugerem o alvo de manutenção da glicemia seguro para os pacientes cirúrgicos, sem concluir se deve ser obtido com controle glicêmico intensivo ou moderado.

Introduction

In surgical patients, the presence of diabetes mellitus (DM) or hyperglycemia is associated with increased morbidity and mortality, with a perioperative mortality rate up to 50% higher than in the non-diabetic population.[1] There are multiple reasons for these adverse outcomes, such as failure to identify diabetic or hyperglycemic patients; multiple comorbidities including micro and macrovascular complications; complex polypharmacy and insulin prescription errors; increased perioperative and postoperative infections; associated episodes of hypoglycemia and hyperglycemia[1]; a lack of (or inadequate) institutional protocols for management of diabetic or hyperglycemic inpatients; and inadequate knowledge of diabetes and hyperglycemia management amongst staff providing care.[2]

Material and methods

We searched multiple databases, including Medline via PubMed (January 1966 to August 2016), The Cochrane Library and Lilacs (from 1982 to August 2016). After a bibliographical survey, the articles with better methodological design were selected. We also use the evidence-based updates from the UpToDate and Medscape domains. There was no language restriction.

Searches were performed between May and August 2016. The following strategies were used for searches in PubMed:

1. ''Diabetes Mellitus'' [All Fields] AND ''Anesthesia'' [All Fields], ''Diabetes Mellitus'' [All Fields] AND ''Perioperative Period'' [All Fields], ''Glycemic Control'' [All Fields] AND ''Perioperative Care'' [All Fields], ''Glycemic Control'' [All Fields] AND ''Anesthesia'' [All Fields], ''Diabetes Mellitus'' [All Fields] AND ''Anesthesia'' [All Fields] AND ''Perioperative'' [All Fields];
2. ''Diabetes Mellitus'' [MeSH Terms] AND ''Anesthesia'' [MeSH Terms], ''Diabetes Mellitus'' [MeSH Terms] AND ''Perioperative Period'' [MeSH Terms], ''Anesthesia'' [MeSH Terms] AND ''Diabetes Mellitus'' [MeSH Terms] AND ''Perioperative Period'' [MeSH Terms], ''Diabetes Mellitus'' [MeSH Terms] AND ''Perioperative Care'' [MeSH Terms];
3. ''Diabetes Mellitus'' [MeSH Terms] OR (''diabetes'' [All Fields] AND ''mellitus'' [All Fields]) OR ''diabetes mellitus'' [All Fields] AND (''anaesthesia'' [All Fields] OR ''anesthesia'' [MeSH Terms] OR ''anesthesia'' [All Fields]) AND Perioperative [All Fields].

Physiological changes and anesthetic implications

Diabetes mellitus is a disease characterized by abnormality in carbohydrate metabolism, which evolves with hyperglycemia. If left untreated, it is a debilitating disease, leading to chronic organ failure and dysfunction. Type 1 diabetes (DM1) results from the destruction of insulin-producing pancreatic β-cells by an autoimmune mechanism, causing complete deficiency in insulin secretion. Type 2 diabetes (DM2), the most common form of diabetes, is a consequence of peripheral resistance to insulin action and is frequently associated with progressive failure in insulin secretion over the years, resulting from dysfunction in pancreatic β-cells due to glycotoxicity, lipotoxicity, and amyloid formation.[3]

The diagnostic criteria for diabetes mellitus are listed in Table 1.

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