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ORIGINAL ARTICLE

Diabetic ketoacidosis in a pediatric intensive care unit[☆]

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KEYWORDS

Diabetic ketoacidosis;
Children;
Cerebral edema;
Mortality;
Diabetes mellitus

Abstract

Objective: To describe the characteristics of children aged 0–14 years diagnosed with diabetic ketoacidosis and compare the following outcomes between children with prior diagnosis of type 1 diabetes mellitus (DM1) and children without prior diagnosis of DM1: length of hospital stay, severity on admission, insulin dosage, time of continuous insulin use, volume of fluids infused during treatment, and complications. **Q2**

Methods: A retrospective descriptive study with review of medical records of patients admitted to the pediatric intensive care unit of a referral hospital from June 2013 to July 2015. The following data regarding 52 admissions were analyzed: age, sex, weight, body surface area, signs, symptoms and severity on admission, blood gas, blood glucose, glycated hemoglobin, serum osmolarity, and index of mortality. The insulin dosage, time of continuous insulin use, volume administered in the expansion phase and in the first 24 h, length of stay, and complications such as electrolyte disturbances, hypoglycemia, cerebral edema, and death were compared between the two groups.

Results: Patients without a previous diagnosis of DM1 were younger at admission, with mean age of 8.4 years ($p < 0.01$), reported more nausea or vomiting, polydipsia and polyuria, and showed more weight loss ($p < 0.01$). This study also observed a higher prevalence of hypokalemia ($p < 0.01$) and longer hospital stay in this group.

Conclusions: No differences in severity between groups were observed. The study showed that children without prior diagnosis of DM1 were younger at admission, had more hypokalemia during the course of treatment, and had greater length of hospital stay.

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PALAVRAS-CHAVE

Cetoacidose
diabética;
Crianças;
Edema cerebral;
Mortalidade;
Diabetes mellitus

Cetoacidose Diabética em uma Unidade de Terapia Intensiva Pediátrica**Resumo**

Objetivo: Descrever as características de pacientes de zero a 14 anos admitidos com diagnóstico de Cetoacidose Diabética (CAD) e comparar desfechos entre os pacientes com diabetes melito tipo 1 (DM I) prévio e aqueles sem DM I prévio: tempo de internação, gravidade na admissão, dose de insulina utilizada, tempo de insulinização contínua, volume de líquido infundido durante o tratamento e complicações.

Métodos: Estudo descritivo retrospectivo com revisão de prontuários de pacientes internados na UTI pediátrica de um hospital de referência no período de junho de 2013 a julho de 2015. Analisamos os seguintes dados referentes a 52 internações: idade, sexo, peso, superfície corporal, sinais, sintomas, gravidade na admissão, gasometrias, glicemia, hemoglobina glicada, osmolaridade sérica e índice de mortalidade. As crianças com diabetes já diagnosticado foram comparadas com aquelas sem diagnóstico prévio quanto à dose de insulina, tempo de insulinização contínua, volume infundido na fase de expansão e nas primeiras 24 horas, tempo de internação e complicações como distúrbios hidroeletrólíticos, hipoglicemia, edema cerebral e morte.

Resultados: Os pacientes sem diagnóstico prévio de DM I eram mais jovens no momento da admissão, com média de idade de 8,4 anos ($p < 0,01$). Relataram mais sintomas como vômitos, polidipsia e poliúria e apresentaram mais perda de peso ($p < 0,01$). Observamos maior prevalência de hipocalemia ($p < 0,01$) e maior tempo de internação no grupo acima citado.

Conclusões: Não observamos diferenças quanto a gravidade entre os grupos. Pacientes diabéticos prévios eram mais jovens na admissão, apresentaram mais hipocalemia durante o tratamento e permaneceram mais tempo internados.

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Introduction

Diabetic ketoacidosis (DKA) is a potentially severe and common condition in emergency rooms and pediatric intensive care units (PICU). It is one of the major complications in patients with type 1 diabetes mellitus (DM1). In Brazil, approximately 20% of patients with previously undiagnosed DM1 initially present with DKA. It is more common in children under 4 years of age and affects 10/100,000 children.^{1,2} As a complication in children already diagnosed with DM1, DKA occurs in 1–10% of cases.²

Hospital da Criança Conceição (HCC), located in the city of Porto Alegre, state of Rio Grande do Sul, Brazil, is a reference center for the treatment of children with DM1. Patients admitted for DKA are referred for treatment in the PICU of the institution, and after the initial management and resolution of acidosis, they are followed at the Outpatient Clinic of the Institute for Children with Diabetes (ICD). Although it is a reference for the care of these patients, the service does not have a care protocol.

DKA treatment has been widely studied and described in the literature; however, there are few studies comparing the clinical characteristics and outcomes between patients admitted for DKA with previously diagnosed DM1 and those with no prior diagnosis of DM1. The objective of this study is to evaluate the characteristics and outcomes of patients admitted for DKA in the intensive care unit of HCC, comparing the following variables between the patient with a DM1 diagnosis and those without previous diagnosis: length of hospital stay, severity on admission, prognostic

index (Pediatric Index of Mortality II), insulin dose, time of continuous insulin use, liquid volume infused during treatment, and complications.

Methods

A descriptive, retrospective study was carried out, based on a review of medical records of patients with DKA diagnosis admitted to the PICU of HCC, Porto Alegre, from June 2013 to July 2015. A total of 52 admissions of patients aged between zero and 14 years admitted for DKA treatment were analyzed. DKA diagnosis was defined according to the criteria established by the International Society for Pediatric and Adolescent Diabetes (ISPAD) Consensus of 2014: venous or arterial blood gas pH < 7.3 and/or bicarbonate < 15 mmol/L, glucose or hemoglucotest > 200 mg/dL, presence of ketonemia or ketonuria.³ Patients with other diseases in addition to metabolic acidosis were excluded. DKA cases were identified from the PICU database. Data collection was performed using a standardized tool that contained the following variables: age, gender, weight, body surface area, initial diagnosis of DM1 or previous DM1, signs and symptoms on admission, blood gas data (pH, pCO₂, HCO₃⁻, BE) on admission and after withdrawal of continuous insulin use, time of continuous insulin use, administered insulin dose, initial blood glucose and during the course of treatment, glycated hemoglobin levels, serum osmolality, prognostic index, infused volume at the expansion phase and in the first 24 h of treatment, and

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