



ORIGINAL ARTICLE

Clinical features, mortality, hospital admission, and length of stay of a cohort of adult patients with diabetic ketoacidosis attending the emergency room of a tertiary hospital in Spain



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KEYWORDS

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Diabetes mellitus;
Mortality;
Hospitalization;
Length of stay;
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Abstract

Aim: To assess the clinical features, length of stay, incidence rate, mortality, and hospital admissions of patients with episodes of diabetic ketoacidosis (DKA).

Patients: It was conducted retrospective, cross-sectional study of 164 consecutive admissions of adult patients (2008–August 2012), with type 1 or type 2 diabetes already known or new onset.

Results: Mortality rate was 1.2%. The DKA episodes were mild (18.9%), moderate (31.7%), or severe (49.4%). The cumulative incidence was 2.66 cases/1000 patients with diabetes (DM) in 4.5 years. The most common causes triggering DKA were infection (33.2%) and dietary transgression and/or insulin dose omission (30.7%). A total of 12.8% of patients had new onset DM, 56.7% type 1, and 26.8% type 2 DM. Patients with type 2 DM were older and had at admission higher creatinine, BUN, osmolality, sodium, and anion gap levels. Patients with new-onset of DM had higher levels of glucose and sodium, but lower potassium levels. No differences were found in pH or bicarbonate. Admission to the intensive care unit (ICU) was required in >50% of cases ($p < 0.001$), and 86.6% of patients were finally admitted to a medical ward ($p = 0.005$). The length of stay at the ICU ($p < 0.001$) and hospital ($p = 0.013$) was significantly different depending on DKA severity.

Conclusions: Most DKA episodes require hospital admission, but mortality is <2%, and length of stay at the ER and medical ward depends on type of DM and initial severity of the episode.

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PALABRAS CLAVE

Cetoacidosis diabética;
Diabetes mellitus;
Mortalidad;
Hospitalización;
Duración de la estancia;
Urgencias

Características clínicas, mortalidad, hospitalización y duración de la estancia de pacientes adultos con cetoacidosis diabética admitidos en un servicio de urgencias de un hospital terciario en España

Resumen

Objetivo: Se investigaron las características clínicas, la duración, la tasa de incidencia, la mortalidad y los ingresos de episodios de cetoacidosis diabética (CAD).

Pacientes: Se realizó un estudio retrospectivo, transversal, con 164 admisiones consecutivas de adultos (2008–agosto 2012), con diabetes (DM) tipo 1 y 2 ya conocida o debut diabético.

Resultados: La tasa de mortalidad fue del 1,2%. Los episodios de CAD fueron leves (18,9%), moderados (31,7%) y graves (49,4%). La incidencia acumulada fue de 2,66 casos/1.000 pacientes con DM en 4,5 años. Las causas desencadenantes más frecuentes fueron las infecciones (33,2%) y la transgresión dietética y/u omisión de la dosis de insulina (30,7%). El 12,8% tuvieron un debut diabético, 56,7% eran DM tipo 1 y el 26,8% tipo 2. Los casos con DM tipo 2 tenían mayor edad y presentaban al ingreso mayores niveles de creatinina, BUN, osmolaridad, sodio y anion GAP. El debut diabético presentaba niveles más elevados de glucosa y sodio, pero valores más bajos de potasio. No se encontró ninguna diferencia en el pH o bicarbonato. La admisión en la unidad de cuidados intensivos (UCI) se requirió en más del 50% de los casos ($p < 0,001$) y un 86,6% fue finalmente ingresado en una planta de hospitalización médica ($p = 0,005$). La duración de las estancias en la UCI ($p < 0,001$) y en el hospital ($p = 0,013$) fueron significativamente diferentes según la gravedad de la CAD.

Conclusiones: La mayoría de las crisis de CAD requieren de ingreso, pero la mortalidad es inferior al 2%, variando la duración de la estancia en urgencias y hospitalización dependiendo del tipo de DM y la gravedad inicial del episodio.

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Introduction

The prevalence of diabetes mellitus (DM) is having a dramatic rise in the last decades. Wild et al.¹ estimated that in developed countries would be a 54% increase of this disease by 2030 (9% of the total population), becoming this increasing even higher (up to 80%) in those older than 65 years old.

Although there are well-defined criteria for both diabetic ketoacidosis (DKA) and hyperglycaemic hyperosmolar state (HHS), it could also be found hyperglycaemic states with mixed features, depending on each given case and the underlying cause of decompensation.² The mortality of DKA and HHS ranges from less than 5 to 11%, respectively.^{2,3} Moreover, patients with type 2 DM could also have DKA crises under certain acute stress catabolic circumstances such trauma, surgery or infection.^{4–6}

Some authors⁷ have previously reported data on our community about patients admitted to the emergency department (ED) of a tertiary teaching hospital. They reported an incidence of 8.09 episodes of DKA in 10⁵ inhabitants and a mortality rate of 6.52%. More recently other authors have also notified a lower DKA mortality rate at 28 days, ranging between 3.4%⁸ and 2.65%.⁹ Perhaps, these percentages might be more similar to what could be a priori expected in current day-by-day clinical practice. However, most available data on this issue came from cited manuscripts prior to 1985.^{2,3} Therefore, there are not recent studies that show the real impact of improvements in the therapy on mortality in adults with DKA.

The principal objective of the current study is to know the mortality rate of DKA in the ED and after any hospital admission in a university tertiary hospital. In addition, we also aim to obtain the cumulative incidence (CI) of DKA in our health's community scope, the length of stay in ED, which category of DKA is more associated with admission in the intensive care station (ICS) or general medical ward and length of stay in these hospital sections, and, finally, if there are any differences between DKA episodes in patients with type 2 and type 1 DM.

Patients and methods

We designed a retrospective, single-center and cross-sectional study of consecutive admissions of patients in the ED of the University Hospital Ramon y Cajal. The recent study Dia@bet.es¹⁰ estimated, in turn, a DM prevalence in Spain of 13.8% per 100 inhabitants over 18 years old. So, in our area, the target population was approximately 61,698 people (according to data of health area in 2011). According to previous articles of similar scope,^{4,6} the incidence of DKA ranges from 4.6 to 8 episodes per 1000 patients with diabetes. The calculation of the sample size was carried out to achieve a 3% of precision in estimating a proportion using a bilateral, normal and asymptotic confidence interval (95%), and assuming that the ratio of DKA cases is 4% per 1000 patients with diabetes. These calculations result in 164 experimental cases to get a power of 0.8.

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