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*Review Article*

# Diabetic Ketoacidosis at Diagnosis and Glycemic Control in the First Year of Childhood Onset Type 1 Diabetes - Prospective Study about 110 Patients

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## Introduction

Up to 80% of diabetic children worldwide are diagnosed with diabetic ketoacidosis (DKA) at the onset of their diabetes DKA is the most serious acute complication of T1D, c is an absolute metabolic emergency that can put the child's vital prognosis at stake, it is the leading cause of mortality in diabetic children, moreover it is responsible for significant morbidity, and enormous expenses linked to prolonged hospitalization in intensive care, and the social costs it generates,

DKA is not only an acute complication but can also predict poor long-term glycemic control. Massive destruction of Langerhans B cells cause and consequence of DKA reduces honeymoon remission periods »with increasing needs for exogenous insulin, associated with high HBAlc levels leading to chronic microvascular complications, themselves responsible for morbidity, mortality and a heavy economic burden

## Main objective

We analyzed associations between DKA at diagnosis and glycemic control during the first year post-diagnosis.

## Materials and Methods

This is a descriptive and analytical cross-sectional study with prospective recruitment Over a period of one year, 110 patients aged 1 to 16 years old who were diagnosed with type 1 diabetes in pediatric emergencies Age, gender, family socioeconomic status, symptoms and their duration, patient pathway to diagnosis, clinical and biological signs at diagnosis, and family history of T1D were collected for each newly diagnosed patient. Diabetic ketoacidosis (DKA) was defined according to the ISPAD 2018 definition with pH < 7.30 or bicarbonate < 15 mmol/L, and severe ketoacidosis by pH < 7.10 or bicarbonate < 5 mmol/L.

Glycosylated hemoglobin was determined initially at diabetes diagnosis for each patient and every 3 months during the first year after diagnosis, the average glycosylated hemoglobin for the 02 groups of patients with and without DKA was compared during the 1st year as well as the average insulin dose.

## Results

At the time of diagnosis, 15.5% of children were aged 0 to 2 years, 24.5% from 2-5 years and 32.7% from 6-10 years and 27.3% from 10-16 years. The overall prevalence of DKA was 50.9%. DKA was severe in 57.1% and mild or moderate in 42.9% DKA was globally more frequent in younger children p=0.013 however no age interval had any impact on the occurrence of DKA p=0.09 nor in its severity p=0.2181, patients with poor economic conditions, parents without profession were more likely to present DKA respectively p=0.001, p=0.0187 and p 0.0172.

Data from our study demonstrated that children without DKA at onset had significantly better glycemic control than children with DKA based on their average HB1C during the 1st year after diagnosis, it was significantly better high in children with DKA compared to children without DKA respectively 8.17±0.079 and of 7.190.± 0.65 P< 0.001 this throughout the year at 3, 6, 9, 12 months following the diagnosis, so much so that we noted that HB1C underwent the same trajectory of evolution during the 1st year after diagnosis for the 02 groups of patients, a significant reduction compared to the initial HB1C, at 03 months it went from 7.19±0.65 to 7.01%0.8±6 for patients without DKA and 8.17% ±0.079 to 7.69%± 1.2 for patients with DKA but it remained significantly lower in children without ACD p<0.001

Even if we recognize through our study the clear improvement in glycemic balance for the 02 groups, however the children without DKA were more numerous to reach an HB1C lower than 7%, at 3 months 50% of the patients without ACDI reached it versus only 28.5% of patients with DKA Metabolic control will gradually deteriorate between 3-12 months for the 02 groups or only 40% reached the glycemic target at 12 months for patients without DKA Versus 1.9% for ACD+P<0.001

At 12 months we noted an increase in the rate of patients with poor glycemic control greater than 9%, it increased from 7.9% at 3 months to a rate of 29.6% for the DKA group and from 00% to 3.6% . for patients without DKA ,patients diagnosed at the DKA stage had significantly deteriorated their glycemic balances at 12 months (p<0.0001). This coincided with increasing insulin requirements throughout the year in the 02 groups with and without ACD, however they were significantly more significant in children with DKA compared to children without ACDI throughout the year 3, 6, 9, 12 months with respective p values of p<0.001, p<0.001, p<0.001, p<0.01.

Furthermore, our study found a negative impact of the severity of DKA on glycemic balance during the first year; patients who presented with DKA severe had a higher annual average HB1C versus mild or moderate

ACD which was respectively 8.3824 ± 0.6452 versus 7.9186 ± 0.5107 p=0.0313

In short, even if the glycemic control of the 02 DKA+/DKA- groups underwent the same trajectory of evolution with clear improvement at 3 months and a relative deterioration at 12 months, it is significantly better for children without DKA compared to those with DKA both on the annual average HB1C and at 3, 6, 9, 12 months $p<0.0001$ and on the glycemic target reached at 3, 6, 9, 12 months $p<0.01$, with significantly lower insulin requirements at 3-6 -9-12 months $p<0.001$; $p=0.001$; $p=00.1$; $p<0.001$ respectively in patients without DKA

## Conclusion

our study revealed that DKA and its severity at the time of diagnosis had an unfavorable impact on glycemic balance during the first year following diagnosis, hence the need for prevention of DKA at the time of diagnosis through early diagnosis of diabetes which could help avoid long-term complications thanks to better glycemic control.