Analysis of Incident DKA in the Indiana New Onset T1D Patient Population

INDIANA UNIVERSITY SCHOOL OF MEDICINE

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ABSTRACT

Diabetic ketoacidosis (DKA) is a life-threatening complication of type 1 diabetes (T1D) resulting from ketone body production and metabolic acidosis occurring due to insulin deficiency. We sought to define the occurrence of DKA amongst pediatric patients presenting with new-onset T1D in Indiana and to determine whether patterns of DKA were affected by the COVID-19 pandemic. This was a retrospective chart review for pediatric patients admitted to Riley Children's Hospital with a clinical diagnosis of new onset T1D who had available chemistry values. Patients diagnosed from March 23- June 30, 2020 and over the same period in 2019 were included. DKA was classified as mild (bicarbonate 10-15 mmol/L) or severe (bicarbonate <10 mmol/L). Ninety-four patients met inclusion criteria. There was no significant difference in rates of DKA (21 in 2019 vs. 25 in 2020; p>0.05). DKA was present in nearly half of all new onset pediatric T1D cases in Indiana in 2019 and 2020. There was no observed impact of the COVID-19 pandemic on T1D or DKA.

BACKGROUND

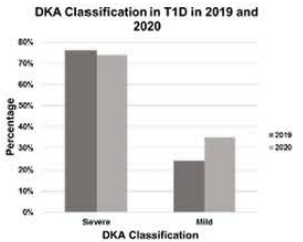
Type 1 diabetes (T1D) is an autoimmune disease characterized by insulin deficiency and hyperglycemia due to destruction of pancreatic beta cells. It was long thought to be solely autoimmune, but further studies have found it to be a complex interaction between the environment, genetic factors, beta cells, and the immune system. Diabetic ketoacidosis (DKA) is a potentially fatal complication of T1D. Decreased insulin leads to poor glucose utilization and hyperglycemia. The body then begins lipolysis and releases free fatty acids from adipose tissue. These fatty acids are oxidized into ketone bodies, which build up and cause ketonemia and a metabolic acidosis. DKA can be precipitated by infection, leading to concern regarding the COVID-19 pandemic.

MATERIALS and METHODS

- Retrospective chart review of admissions to Riley Children's Hospital
- T1D diagnostic code
- Dates set for March 23 - June 30, 2020
- 94 patients <18 years old included
- Data collected and entered into RedCap database
- Analyzed using Graph Pad Prism

RESULTS BLOCK 1

- 48 patients diagnosed with T1D in 2019 vs 46 in 2020
- 46/94 (49%) patients met criteria for DKA
  - 36/46 (79%) were severe
  - 10/46 (21%) were mild
- No significant difference in rates of DKA
- 21/48 (44%) in 2019 vs. 25/46 (54%) in 2020; p>0.05

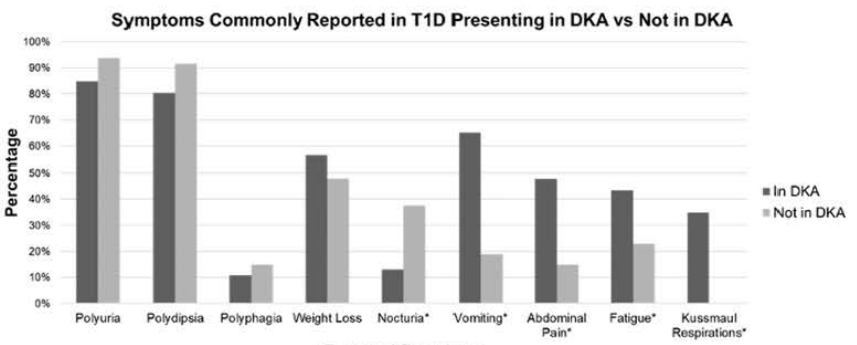


RESULTS TABLE

	DKA (n=46)	No DKA (n=48)	p value
Age, years, mean, (± SD)	9.7 (±4.75)	10.1 (±3.59)	0.67
HbA1c, %, mean, (± SD)	12.3 (±1.80)	11.6 (±2.47)	0.058
BMI, mean, (±SD)	19.5 (±5.16)	19.7 (±7.07)	0.59
Gender			0.06
Female	18	27	
Male	28	19	
Race/Ethnicity			0.48
White, non-Hispanic	34	39	
White, Hispanic	2	0	
Black/African American	4	5	
Unknown	6	4	

No statistically significant differences for any demographic characteristics

RESULTS GRAPH



*Indicates statistical significance with p<0.05

COVID-19

- T1D is often triggered by infection
  - Concern of increased incidence of T1D during the pandemic
- DKA can be precipitated by infection
- Concern that patients would delay seeking care during pandemic
  - Possible increased DKA incidence
- No individuals admitted for DKA had a positive diagnosis of SARS-CoV-2

CONCLUSIONS

- Nearly 50% of new onset T1D cases at Riley were associated with DKA. Most cases were classified as severe.
- There was no difference in DKA between 2019 and 2020, suggesting minimal impact of the COVID pandemic.
- There were no differences in age, BMI, or HbA1c in individuals presenting with or without DKA.
- Associated symptoms differed in those presenting in DKA vs not in DKA

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NIH National Institute of Diabetes and Digestive and Kidney Diseases

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